

# AIR TRAFFIC BY THE NUMBERS

April 2023



Federal Aviation  
Administration

## FAA Contributors to ATO By the Numbers

- **Air Traffic Organization (ATO)**
  - **AJR - System Operations**
    - **AJR-G Performance Analysis**
    - **AJR-B Flight Service**
  - **AJI - Safety and Technical Training Services**
    - **AJI-3 Policy and Performance**
  - **AJM – Program Management Organization**
    - **AJM-33 Aviation Weather & Aero Services**
  - **AJT – Air Traffic Services**
- **Non-ATO**
  - **AOC – Office of Communications**
  - **ABP-230 – Data Analysis and Reporting Services Branch**
  - **APO – Aviation Policy & Plans**
  - **AST – Office of Commercial Space Transportation**
  - **AVS – Aviation Safety**

---

## Data Sources

### Database Name

Aviation System Performance Metrics (ASPM)  
 Operations Systems Network (OPSNET)  
 National Traffic Management Log (NTML)  
 Traffic Flight Management System (TFMS)  
 National Offload Program (NOP)  
 U.S. Civil Airmen Statistics  
 Runway Incursion Data  
 BTS T-100 Market and Segment Data

### Owned/Managed by

AJR-G  
 AJR-G (archive), AJM and AJW  
 AJR-G (archive), AJM and AJW  
 AJR-G (archive), AJM and AJW  
 AJR-G (archive) and AIT  
 APO  
 AVS  
 Bureau of Transportation Statistics

## Table of Contents

FAA Contributors to ATO By the Numbers .....	ii
Data Sources .....	ii
Table of Contents .....	iii
Introduction .....	v
Air Traffic Organization Leadership .....	1
Section 1. FAA Air Traffic Management System Overview for FY2022 .....	2
Class B Airspaces (Airspace around Busiest US Airports) .....	3
Air Traffic Controllers .....	4
Pilot Certificates .....	5
Commercial Flight and Available Seat Mile (ASM) Trends .....	6
Instrument Flight Rule (IFR) and Visual Flight Rule (VFR)* Flights across the NAS .....	6
Section 2. Demand and Efficiency in the NAS .....	8
Core 30 Airport Operations .....	9
Stand-Alone Terminal Radar Control (TRACON) Facilities .....	10
Air Route Traffic Control Centers (ARTCC) and Combined Control Facilities (CCF) .....	11
Number of IFR Flights at Any Given Minute during Peak Operational Times .....	12
Average Hourly Capacity (Called Rate) at Core 30 Airports .....	13
Average Daily Capacity (ADC) - Based on Called Rates at Core 30 Airports .....	14
Section 3. NAS Delay, Diversions, Go-Arounds, and Cancellations .....	15
Counts of NAS Delay at Core 30 Airports .....	16
Delays by Category .....	17
Total Cost of Delay .....	17
Diversions at Core 30 Airports .....	18
Go-Arounds at Core 30 Airports .....	19
Cancellations at Core 30 Airports .....	20
Section 4. Traffic Management Initiatives .....	21
Ground Delay Programs at Core 30 Airports .....	22
Ground Stops at Core 30 Airports .....	23
Airspace Flow Programs by Center .....	24
Holdings by Center .....	25
Section 5. Safety Metrics .....	26
Runway Incursions at Core 30 Airports .....	27
Incursions by Type at Core 30 Airports, FY2022 .....	28

Loss of Standard Separation Count, by Center .....	29
Section 6. Other ATO Topics .....	30
Flight Service Stations .....	31
FAA Flight Services .....	32
Commercial Space Launch Activity .....	33
U.S. Spaceports .....	33
Appendix I. Facility Codes .....	34
Appendix II. Other FAA Airport Lists .....	35
Appendix III. Historical Airport and Center Operations .....	38
Glossary of Terms.....	38
Acknowledgements.....	46

## Introduction

*Air Traffic By the Numbers*, or the *ATO Fact Book*, is a source book containing annual U.S. airport and air traffic control operations and performance data from the Federal Aviation Administration (FAA). It also includes information on air passenger travelers, runway incursions, commercial space launch activity, the economic impact of aviation, and so on.

The *ATO Fact Book*, first published by the Office of Performance Analysis, Air Traffic Organization (ATO) of the FAA in 2017, is updated annually, with data now current up until FY2022. This document represents the seventh edition of *Air Traffic By the Numbers*; six previous editions appeared in August 2017, November 2018, June 2019, August 2020, October 2021, and May 2022.

The storyline behind this year's *Fact Book* continues to be the negative impact of the COVID-19 global pandemic on the volume of air traffic. This impact, which started in March 2020 and continues through FY2022, is diminishing across time. The greatest impact occurred during FY2020.

The format of this edition is mostly unchanged from last year. Section 1 includes some overall aviation-related statistics. NAS demand and efficiency measures appear in Section 2. New delay, diversion, go-around, and cancellation information follow in Section 3. Section 4 includes the latest data on various traffic management initiatives (TMI). Updated safety metric results are reported in Section 5. Other ATO Topics of interest, such as flight service and commercial space, are available in Section 6. This year, the *ATO Fact Book* also show historical annual airport tower and center operations for 1946-2022 (Appendix III).

Below are selected results for FY2022.

- The number of air traffic controllers decreased by 1.1 percent, to 13,693 (in Section 1).
- The number of pilot certificates increased by 5 percent in CY2022 to 756,927; and remote (or drone) pilot certificates increased by 19.5 percent, to 304,256 (Section 1).
- The number of passengers flown by air carriers increased by 55 percent, to 917 million in FY2022 (Section 1). This remains below the pre-pandemic (FY2019) level of 1,057.6 million passengers.
- IFR flights in the U.S. rose by 18.3 percent, to 15.4 million (Section 1). Before the pandemic, IFR flights numbered 16.4 million (FY2019).
- Core 30 airport operations rose by 23.2 percent, to 11.8 million; operations handled by stand-alone TRACONS rose by 15.4 percent, to 18.9 million, while operations handled by centers rose by 21.5 percent, to 41.4 million (Section 2). Airport, TRACON, and center operations were higher before the pandemic, at 13.2 million, 20.3 million, and 43.7 million, respectively.

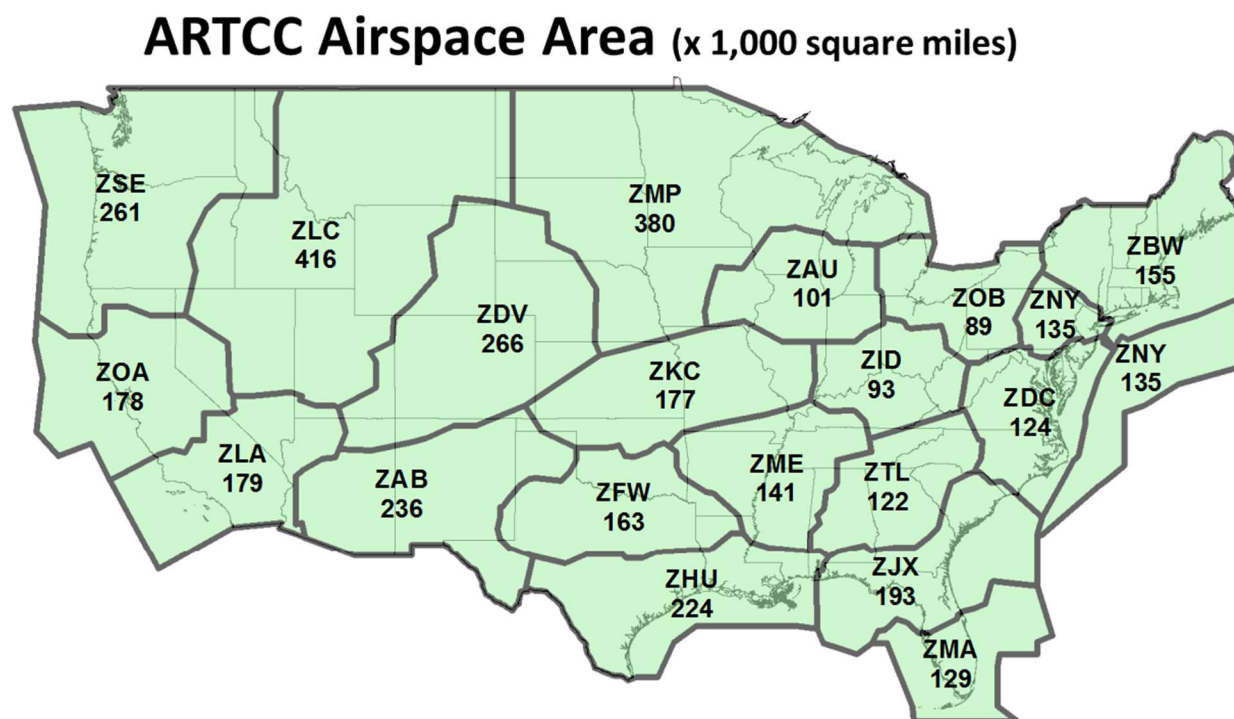
Work on this publication benefited from the contributions of many offices and individuals throughout the Air Traffic Organization and the Federal Aviation Administration. As always, we thank everyone who participated in this effort.

System Events and Analysis Group (AJR-G3)  
Office of Performance Analysis  
System Operations Services  
Air Traffic Organization  
Federal Aviation Administration  
U.S. Department of Transportation

April 2023

## Air Traffic Organization Leadership

[www.faa.gov/about/office\\_org/headquarters\\_offices/ato/leadership](http://www.faa.gov/about/office_org/headquarters_offices/ato/leadership)



## Section 1. FAA Air Traffic Management System Overview for FY2022

<b>ATO Program and Financing</b>	<b>\$8.5</b>
<b>Operations Budget Estimate (in \$billions) (FY2022)</b>	
<b>Flights Handled</b>	<b>15,416,640</b>
Scheduled	8,895,474
Unscheduled	6,521,166
<b>Airspace (in millions of sq mi)</b>	<b>29.4</b>
Oceanic	24.1
Domestic	5.3
<b>Airports</b>	<b>19,507</b>
Public Airports	5,175
Private Airports	14,332
<b>Federal Air Traffic Control Facilities</b>	<b>313</b>
Stand-Alone ATC Tower Facilities	139
Stand-Alone TRACON Facilities	25
Combined ATC Tower/TRACON Facilities*	124
Centers and Combined Control Facilities	25
ARTCC	21
CCFs	4
<b>Contract Air Traffic Control Towers**</b>	<b>262</b>
<b>NAVAIDS</b>	<b>12,865</b>
<b>Alaska Weather Cameras</b>	<b>237</b>
<b>Controllers</b>	<b>13,693</b>
<b>GA Aircraft (CY2021)</b>	<b>209,200</b>
Fixed Wing	164,300
Rotorcraft	10,000
Experimental/Lightcraft/Other	34,900
<b>GA Flight Hours (CY2021)</b>	<b>26,441,000</b>

\*Combined ATC Towers and TRACONs are located within the same building.

\*\*Includes two new contract towers introduced during FY2023.

### Sources:

**ATO Program and Financing:** U.S. Dept. of Transportation, Budget Estimates: FY2023, Federal Aviation Administration, Exhibit II-2.

**Flights Handled:** Federal Aviation Administration, Air Traffic Organization, Office of Performance Analysis (AJR-G), December 6, 2022; Innovata, Flight Schedule Database, accessed November 8, 2022.

**Airspace:** Federal Aviation Administration, Air Traffic Organization, Office of Performance Analysis (AJR-G).

**Airports and NAVAIDS:** Federal Aviation Administration, Air Traffic Organization, Airport Safety, Airport Data and Information Portal (ADIP), November 18, 2022. <https://adip.faa.gov/agis/public/#/airportSearch/advanced>; Federal Aviation Administration, Air Traffic Organization, Technical Operations (AJW), Facility Service and Equipment Profile, October 4, 2021. [https://my.faa.gov/org/linebusiness/ato/operations/ajw1/noag/nas\\_policy/fsep.html](https://my.faa.gov/org/linebusiness/ato/operations/ajw1/noag/nas_policy/fsep.html)

**ATC Towers, TRACONs, and En Route Centers & CCFs:** Federal Aviation Administration, Air Traffic Organization, Air Traffic Services (AJT).

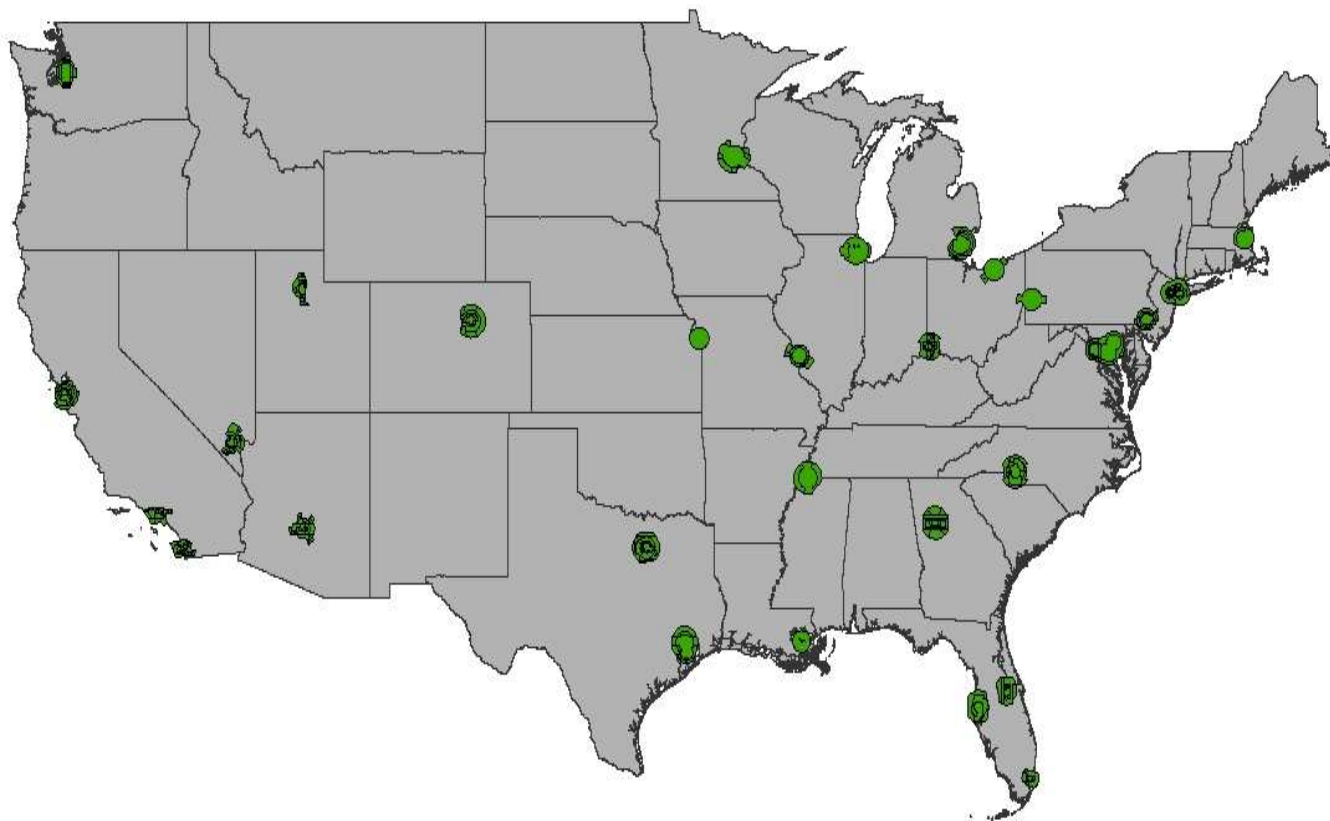
**Alaska Weather Cameras:** Federal Aviation Administration, Air Traffic Organization, Aviation Weather & Aeronautical Services (AJM-33), FAA Aviation Weather Cameras, accessed October 28, 2022. <https://weathercams.faa.gov>

**Controllers:** Federal Aviation Administration, Office of Finance and Management, Data Analysis and Reporting Services Branch (ABP-230), Air Traffic Controller and Academy Movement Report - September FY2022, October 4, 2022.

**GA Aircraft and GA Flight Hours:** Federal Aviation Administration, Aviation Safety (AVS), General Aviation and Part 135 Activity Surveys – CY2021, Tables 1.1 and 1.3, March 1, 2022. [https://www.faa.gov/data\\_research/aviation\\_data\\_statistics/general\\_aviation/](https://www.faa.gov/data_research/aviation_data_statistics/general_aviation/)

### ***Class B Airspaces (Airspace around Busiest US Airports)***

Note: Airspaces accurately represented for coverage area

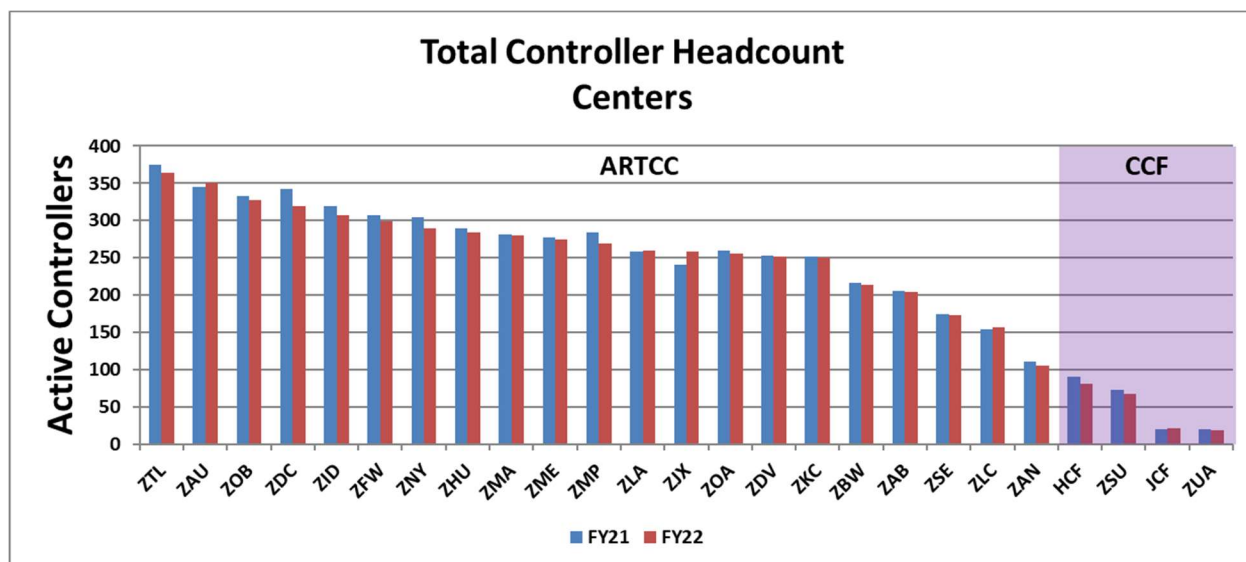
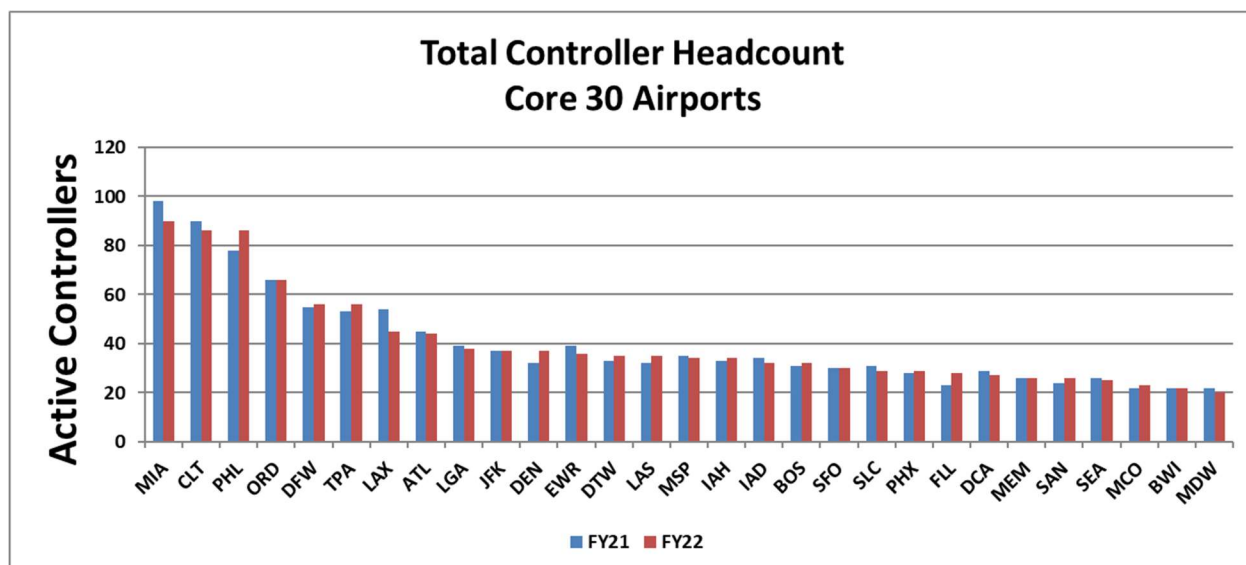


## Air Traffic Controllers

As of the end of FY2022, the FAA air traffic controller total was 13,693, a decrease from 13,850 at the end of FY2021.

	FY2021	FY2022
Academy Graduate (AG)	917	643
Developmental (D1)	196	207
Developmental (D2)	534	596
Developmental (D3)	457	451
Certified Professional (CPC)	10,580	10,578
Certified Professional in training (CPCIT)	1,031	943
<b>Controllers</b>	<b>13,715</b>	<b>13,418</b>
<b>Academy</b>	<b>135</b>	<b>275</b>
<b>Total Head Count</b>	<b>13,850</b>	<b>13,693</b>

Among Core 30 airports, Miami (MIA), Charlotte (CLT), and Philadelphia (PHL) reported large headcounts because these are combined ATCT TRACONS. PHL had the highest net gain of controllers at eight, while LAX had the highest net loss at nine. (See, Appendix I for explanations of the Core 30 airport and Center codes.)



Source: Federal Aviation Administration, Office of Finance and Management, Data Analysis and Reporting Services Branch (ABP-230), Air Traffic Controller and Academy Movement Report - September FY2022, October 4, 2022.

## Pilot Certificates

The table below shows the number of pilot certificates held by age group (upper panel below) and by year (lower panel). The upper panel illustrates that student, commercial, and remote (or drone) pilots tend to be younger, while airline transport pilots tend to be older. The lower panel informs us that the number of total active pilot certificates held in the U.S. increased by 5 percent, from 720,603 in CY2021 to 756,927 in CY2022, mainly due to an increase in student pilot certificates from 250,197 to 280,582. Further, the number of remote pilot certifications (which began in August 2016) increased by 19.5 percent, from 254,587 in 2021 to 304,256 in 2022. (Note, the pilot total does not include flight instructors and remote pilots.)

**Estimated Active Pilot Certificates Held by Category and Age Group of Holder,  
as of December 31, 2022**

By Age Group	Type of Pilot Certificates							Certified Flight Instructor 2/	Remote Pilot 2/
	Total	Student	Sport	Recreational	Private 1/	Commercial 1/	Airline Transport 1/		
<b>Total</b>	<b>756,927</b>	<b>280,582</b>	<b>6,957</b>	<b>80</b>	<b>176,328</b>	<b>119,832</b>	<b>173,148</b>	<b>125,075</b>	<b>304,256</b>
14-15	640	640	0	0	0	0	0	0	0
16-19	27,407	20,927	12	2	6,020	446	0	157	4,032
20-24	79,668	43,183	69	0	20,231	14,689	1,496	8,130	18,505
25-29	94,030	52,235	139	6	14,858	18,810	7,982	13,231	37,325
30-34	83,679	45,265	232	8	13,434	12,894	11,846	12,694	43,551
35-39	74,898	33,162	334	2	13,614	10,557	17,229	14,044	42,874
40-44	65,822	24,407	346	0	12,632	8,595	19,842	13,252	36,821
45-49	54,101	16,390	365	5	10,819	6,632	19,890	11,224	30,200
50-54	57,240	13,520	515	4	12,897	7,355	22,949	11,669	27,702
55-59	59,090	11,030	765	8	14,771	7,561	24,955	10,586	22,326
60-64	56,155	8,417	999	6	17,101	7,887	21,745	9,371	17,777
65-69	43,434	5,678	1,151	18	16,942	7,915	11,730	8,049	12,526
70-74	29,410	3,300	899	9	12,089	6,688	6,425	5,899	6,659
75-79	19,316	1,660	664	9	7,085	5,597	4,301	4,339	2,969
80 & over	12,037	768	467	3	3,835	4,206	2,758	2,430	989

By Year									
<b>2015</b>	<b>590,038</b>	122,729	5,482	191	186,786	116,291	158,559	102,628	N/Ap
<b>2016</b>	<b>584,361</b>	128,501	5,889	178	174,517	112,056	163,220	104,382	20,362
<b>2017</b>	<b>609,306</b>	149,121	6,097	157	174,516	114,186	165,228	106,692	69,166
<b>2018</b>	<b>633,316</b>	167,804	6,246	147	175,771	115,776	167,572	108,564	106,321
<b>2019</b>	<b>664,563</b>	197,665	6,467	130	173,080	116,572	170,649	113,445	160,302
<b>2020</b>	<b>691,689</b>	222,629	6,643	107	172,945	119,245	170,120	117,558	206,322
<b>2021</b>	<b>720,603</b>	250,197	6,801	86	173,606	119,827	170,086	121,270	254,587
<b>2022</b>	<b>756,927</b>	280,582	6,957	80	176,328	119,832	173,148	125,075	304,256

1/ Includes pilots with an airplane and/or a helicopter and/or a glider and/or a gyroplane certificate. Pilots with multiple ratings are reported under highest rating. For example a pilot with a private helicopter and commercial airplane certificates are reported in the commercial category.

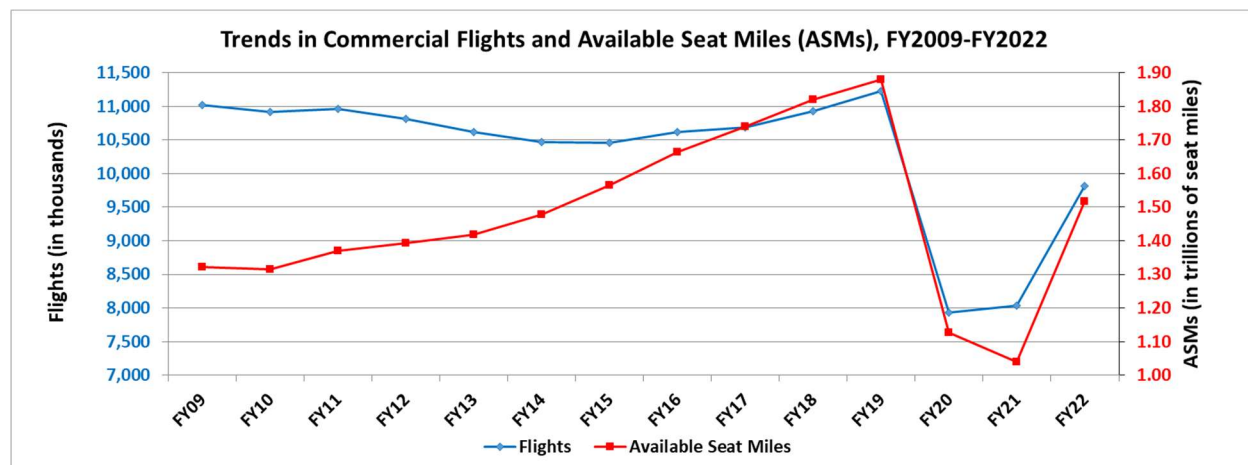
2/ Not included in total active pilots.

N/Ap Not applicable.

Source: Federal Aviation Administration, Office of Aviation Policy and Plans (APO), U.S. Civil Airmen Statistics, 2022, Table 12, January 19, 2023. [https://www.faa.gov/data\\_research/aviation\\_data\\_statistics/civil\\_airmen\\_statistics/](https://www.faa.gov/data_research/aviation_data_statistics/civil_airmen_statistics/)

## Commercial Flight and Available Seat Mile (ASM) Trends

Thus far, the COVID-19 pandemic affected commercial air passenger travel from FY2020 through FY2022. In FY2022, the number of scheduled commercial flights and number of passengers only partly recovered to pre-pandemic levels; the number of flights rose by 22.1 percent to 9.8 million and the number of passengers rose by 55 percent to 917 million. Revenue passenger miles (RPMs) and available seat miles (ASMs) rose by 55 and 80 percent, to 1.19 and 1.52 trillion, respectively. Load factor, the percentage of available seat miles flown by paying commercial passengers, rose from 63.80 to 78.77 percent. The table below shows passenger statistics for the three most recent fiscal years.



Source: U.S. Dept. of Transportation, Bureau of Transportation Statistics, T100 Segment Data, January 24, 2023.

Passengers				
	FY 2019	FY 2020	FY 2021	FY 2022
<b>Yearly Passengers</b>	1,057,645,399	574,946,209	590,356,606	917,029,842
<b>Average Daily Passengers</b>	2,897,659	1,570,891	1,617,415	2,512,411
<b>Revenue Passenger Miles (trillions)</b>	1.57	0.78	0.66	1.19
<b>Available Seat Miles (trillions)</b>	1.88	1.13	1.04	1.52
<b>Passenger Load Factor (%)</b>	83.36%	69.20%	63.80%	78.77%

Economic Impact of Civil Aviation		
	CY2019*	CY2020*
<b>Aviation in US generates # jobs</b>	10,393,000	4,931,000
<b>Earnings of (billions)</b>	\$541.10	\$259.10
<b>Aviation contributes annually (trillions)</b>	\$1.92	\$0.91
<b>Constitutes % of GDP</b>	4.9%	2.3%

\*Estimates for more recent years are not yet available.

Sources:

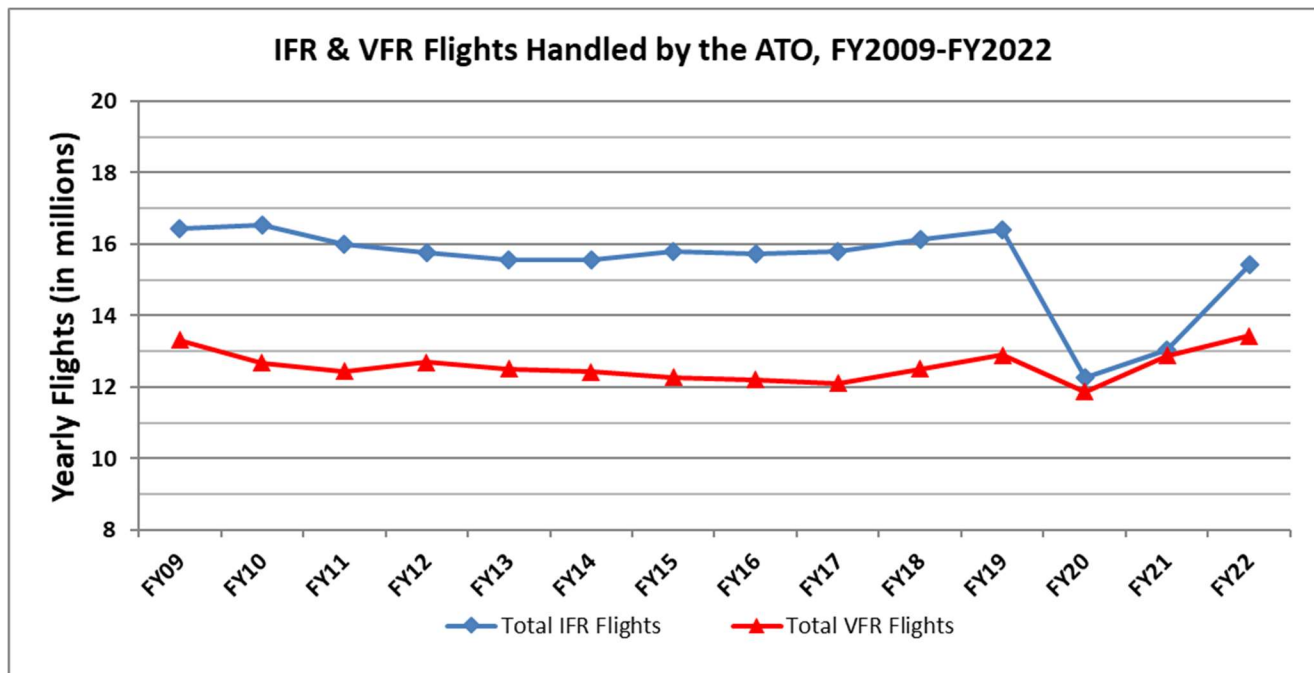
**Passenger Statistics:** U.S. Dept. of Transportation, Bureau of Transportation Statistics, T100 Segment Data, January 24, 2023.

**Economic Impact of Civil Aviation:** Federal Aviation Administration, Office of Aviation Policy and Plans, Forecast and Performance Analysis Division (APO-100), Economic Impact of Civil Aviation on the U.S. Economy, August 2022.

[https://www.faa.gov/sites/faa.gov/files/2022-08/2022-APL-038%202022\\_economic%20impact\\_report.pdf](https://www.faa.gov/sites/faa.gov/files/2022-08/2022-APL-038%202022_economic%20impact_report.pdf)

## Instrument Flight Rule (IFR) and Visual Flight Rule (VFR)\* Flights across the NAS

Office of Performance Analysis (AJR-G) data show the number of IFR flights rose by 18.3 percent to 15.4 million, and the number of VFR flights rose by 4.3 percent to 13.4 million in FY2022. (During FY2019, prior to the COVID pandemic, IFR flights numbered 16.4 million, while VFR flights amounted to 12.9 million.)



\*Note: Total VFR activity is approximated as airport arrival plus departure operations, divided by 2; plus VFR overflights. Previous editions of the ATO Fact Book did not include VFR overflights.

Total numbers of fiscal year annual IFR and VFR flights also appear in the table below.

Year	IFR Flights	VFR Flights
FY2005	18,645,898	14,489,723
FY2006	18,066,360	14,043,414
FY2007	17,970,314	14,121,870
FY2008	17,908,487	13,831,268
FY2009	16,428,893	13,314,949
FY2010	16,522,406	12,678,715
FY2011	15,992,536	12,433,620
FY2012	15,760,241	12,693,012
FY2013	15,576,396	12,504,343
FY2014	15,546,452	12,425,953
FY2015	15,782,675	12,265,462
FY2016	15,724,478	12,203,468
FY2017	15,800,679	12,104,334
FY2018	16,122,488	12,507,815
FY2019	16,416,056	12,887,828
FY2020	12,270,055	11,864,718
FY2021	13,028,643	12,882,339
FY2022	15,416,640	13,439,378

Source: Federal Aviation Administration, Air Traffic Organization, Office of Performance Analysis (AJR-G), December 6, 2022 (for IFR), January 5, 2023 (for VFR).

## Section 2. Demand and Efficiency in the NAS

The NAS is composed of 521 airport towers (263 Federal and 260 contract towers), 149 terminal radar control (TRACON) facilities (25 stand-alone and 124 combined ATCT), and 25 control centers (21 air route traffic control centers (ARTCC) and 4 combined control facilities (CCF)).

TRACONs handle descending flights received from a center or ascending flights received from an ATC tower (see figure below). Of the 149 TRACONs in the NAS, 124 of them are combined such that the TRACON exists in the same location as the ATC tower. Such facilities include the Miami, Charlotte, and El Paso towers.

Centers handle all en route flights operating on Instrument Flight Rule (IFR) flight plans. Centers receive flights from or hand off flights to other centers throughout the flight's en route phase of operation. They also receive flights or hand off flights to TRACONs when flights enter or exit the en route phase of operation.



This report reveals the demand observed at some of the busiest facilities, represented by the Core 30 airport towers, the 25 stand-alone TRACONs, and all 25 centers (which include 4 CCFs). Efficiency is also reported based on the following metrics:

**Number of Flights at Any Given Minute**

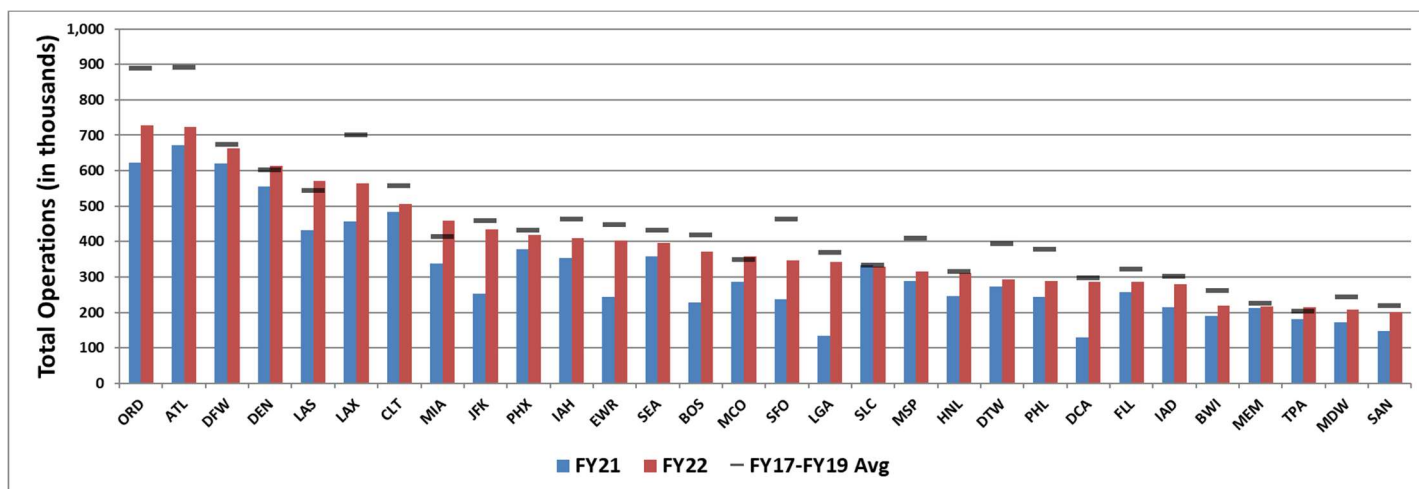
**Average Hourly Capacity**

**Average Daily Capacity**

## Core 30 Airport Operations

Airport operations are the sum of the number of airport arrivals and departures. Airport traffic controllers handle such operations. Each flight has a departure and arrival, meaning each flight roughly consists of two airport operations. In FY2022, Core 30 airport operation numbers rose by 23.2 percent, from 9.5 million in FY2021 to 11.8 million (table below). During the three years before the pandemic (FY2017-FY2019), Core 30 airport operations averaged 13 million; therefore operations remain below this pre-pandemic level. (Among airports operating FAA towers, operations rose by 12.5 percent, to 36.1 million. Among all 523 Federal towers (including 260 contract towers), operations rose by 10.2 percent, to 52.6 million.)

Also shown below are airport operations for each Core 30 airport. In FY2022, Chicago O'Hare (ORD), Atlanta (ATL), and Dallas-Fort Worth (DFW) had the highest number of operations; operations at these airports rose by 16.7, 7.7, and 6.9 percent, respectively. Operations returned to pre-pandemic levels at five airports (Denver (DEN), Las Vegas (LAS), Miami (MIA), Orlando (MCO), and Tampa (TPA).) (See, Appendix I for explanations of the Core 30 airport codes.)



Total Core 30 Airport Operations			
FY17-19Avg	FY21	FY22	%Change
13,014,040	9,544,243	11,758,471	23.2%

Airport	Rank*	FY17-19Avg	FY21	FY22
ATL	2	892,531	672,509	724,226
BOS	14	418,820	227,621	371,622
BWI	26	262,185	189,216	218,649
CLT	7	556,837	483,811	506,290
DCA	23	297,834	128,542	286,580
DEN	4	602,692	555,640	613,679
DFW	3	674,069	620,831	663,426
DTW	21	394,476	272,631	292,174
EWK	12	446,791	244,372	403,583
FLL	24	322,202	256,235	285,994
HNL	20	314,595	246,518	311,135
IAD	25	301,318	215,390	279,429
IAH	11	462,986	354,045	409,248
JFK	9	458,526	253,542	433,538
LAS	5	543,391	431,773	570,513

Airport	Rank*	FY17-19Avg	FY21	FY22
LAX	6	701,467	456,013	564,083
LGA	17	369,527	133,538	342,587
MCO	15	348,469	286,958	358,854
MDW	29	243,601	172,735	208,805
MEM	27	225,764	212,459	216,521
MIA	8	414,830	338,878	459,270
MSP	19	410,011	288,979	315,152
ORD	1	889,128	622,411	727,018
PHL	22	378,600	243,795	288,474
PHX	10	433,000	378,744	419,532
SAN	30	218,941	147,571	201,184
SEA	13	431,030	358,336	397,095
SFO	16	462,422	236,631	346,585
SLC	18	334,366	333,155	328,920
TPA	28	203,632	181,364	214,305

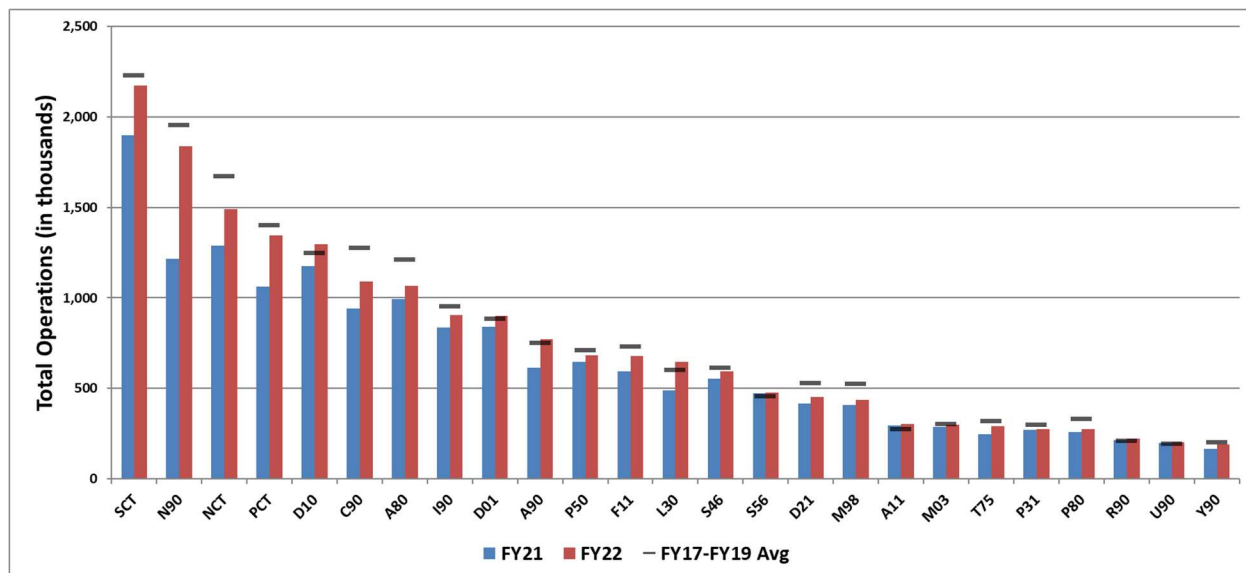
\*Ranked by FY22 operations.

Source: Federal Aviation Administration, Air Traffic Organization, Office of Performance Analysis (AJR-G), [Operations Network \(OPSNET\)](#), November 9, 2022.

## Stand-Alone Terminal Radar Control (TRACON) Facilities

TRACON operations are IFR and VFR itinerant operations passed to and from area airports, other TRACONS, or centers, including overflights through TRACON airspace. In FY2022, among the 25 stand-alone TRACONS, operations rose by 15.4 percent to 18.9 million. Before the pandemic (FY2017-FY2019), stand-alone operations averaged 19.9 million, meaning operations remain below pre-pandemic levels (table below). Among the 124 combined TRACONS, operations numbered 18.8 million in FY2022 (not shown below). Across all 149 TRACONS (stand-alone, plus combined), operations rose by 12.4 percent, from 33.5 to 37.7 million in FY2022. Before the pandemic, operations averaged 38.5 million (not shown below).

Below are operation counts for each of the 25 stand-alone TRACONS for the pandemic years FY2021 and FY2022 and the pre-pandemic annual average (FY2017-FY2019). In FY2022, Southern California (SCT) New York (N90), and Northern California (NCT) had the highest number of operations with more than 1.4 million each. At 8 of the 25 TRACONS, operations recovered to FY2017-FY2019 pre-pandemic levels (graph and table below). (See, Appendix I for explanations of the TRACON facility codes.)



Total Stand-Alone TRACON Operations			
FY17-19 Avg	FY21	FY22	%Change
19,940,704	16,364,414	18,892,526	15.4%

TRACON	Rank*	FY17-19 Avg	FY21	FY22
A11	18	275,585	294,150	302,421
A80	7	1,213,101	991,544	1,067,921
A90	10	750,414	615,069	771,789
C90	6	1,277,423	941,746	1,091,896
D01	9	885,750	840,243	900,930
D10	5	1,247,768	1,175,788	1,295,129
D21	16	530,295	417,218	449,916
F11	12	730,043	592,316	677,008
I90	8	951,472	836,841	904,424
L30	13	602,603	486,361	646,219
M03	19	301,072	286,852	298,687
M98	17	526,313	406,278	436,649
N90	2	1,953,783	1,214,509	1,838,109

\*Ranked by FY2022 operations.

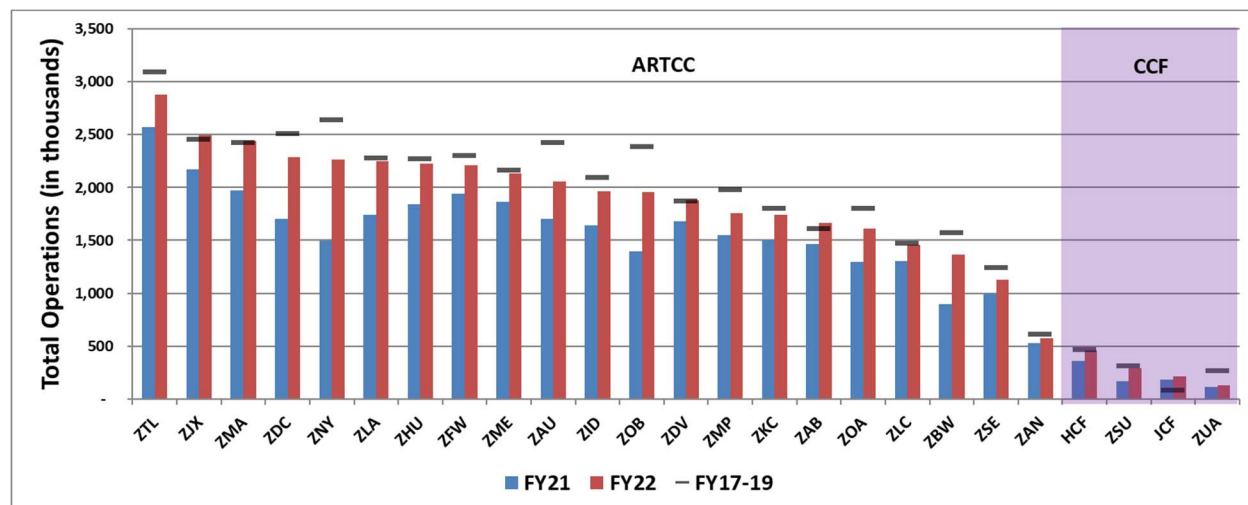
TRACON	Rank*	FY17-19 Avg	FY21	FY22
NCT	3	1,674,540	1,288,200	1,489,120
P31	21	300,023	270,391	274,095
P50	11	708,956	644,049	683,380
P80	22	329,709	258,594	273,620
PCT	4	1,400,750	1,062,059	1,343,486
R90	23	209,962	214,037	223,383
S46	14	615,142	551,590	594,336
S56	15	457,064	470,777	474,131
SCT	1	2,230,827	1,900,186	2,173,998
T75	20	316,870	246,676	289,442
U90	24	193,273	195,501	202,936
Y90	25	201,964	163,439	189,501

Source: Federal Aviation Administration, Air Traffic Organization, Office of Performance Analysis (AJR-G), Operations Network (OPSNET), November 7, 2022.

## Air Route Traffic Control Centers (ARTCC) and Combined Control Facilities (CCF)

Air route traffic control centers (ARTCC) or en route operations are the number of IFR and VFR itinerant operations passing from a TRACON to a center, or from one center to another center, or from a center to a TRACON. It includes U.S. overflights and oceanic traffic through center air space that do not arrive at or depart from U.S. territory. In FY2021, en route operation numbers for the 21 ARTCC and 4 CCFs (combined control facilities) rose by 21.5 percent, from 34.1 to 41.4 million; however, operations have yet to recover to the FY2017-FY2019 pre-pandemic average levels of 44.1 million (table below).

Also shown below are operation counts for FY2021 and FY2022 and the pre-pandemic average for FY2017-FY2019 by center. In FY2022, the Atlanta (ZTL), Jacksonville (ZJX), and Miami (ZMA) centers reported the highest number of operations among the centers, each with more than 2.4 million. Other than Jacksonville, Miami, Denver (ZDV), Albuquerque (ZAB), and Joshua Tree (JCF), center operations at each center did not recover to pre-pandemic average levels (graph and table below). (See, Appendix I for explanations of the ARTCC and CCF codes.)



Total ARTCC & CCF Operations			
FY17-19 Avg	FY21	FY22	%Change
44,147,204	34,097,779	41,436,609	21.5%

		FY17-19		
Center	Rank*	Avg	FY21	FY22
HCF	22	466,374	360,312	459,957
JCF	24	87,067	187,619	218,089
ZAB	16	1,609,158	1,462,863	1,665,476
ZAN	21	611,191	529,551	571,677
ZAU	10	2,421,304	1,705,425	2,054,628
ZBW	19	1,574,246	895,499	1,369,330
ZDC	4	2,509,288	1,704,591	2,285,412
ZDV	13	1,874,490	1,678,040	1,878,702
ZFW	8	2,301,123	1,940,351	2,207,777
ZHU	7	2,271,141	1,839,184	2,228,825
ZID	11	2,092,253	1,645,185	1,967,633
ZJX	2	2,452,192	2,173,040	2,492,247
ZKC	15	1,800,362	1,501,894	1,739,180

		FY17-19		
Center	Rank*	Avg	FY21	FY22
ZLA	6	2,282,499	1,744,128	2,247,809
ZLC	18	1,471,415	1,302,555	1,454,448
ZMA	3	2,424,266	1,973,782	2,440,120
ZME	9	2,162,893	1,865,497	2,135,332
ZMP	14	1,983,224	1,546,621	1,759,386
ZNY	5	2,637,886	1,492,646	2,266,267
ZOA	17	1,802,700	1,299,124	1,613,370
ZOB	12	2,389,671	1,392,770	1,955,286
ZSE	20	1,246,442	994,163	1,128,896
ZSU	23	315,178	171,663	290,086
ZTL	1	3,092,693	2,573,266	2,878,068
ZUA	25	268,149	118,010	128,608

\*Ranked by FY2022 operations.

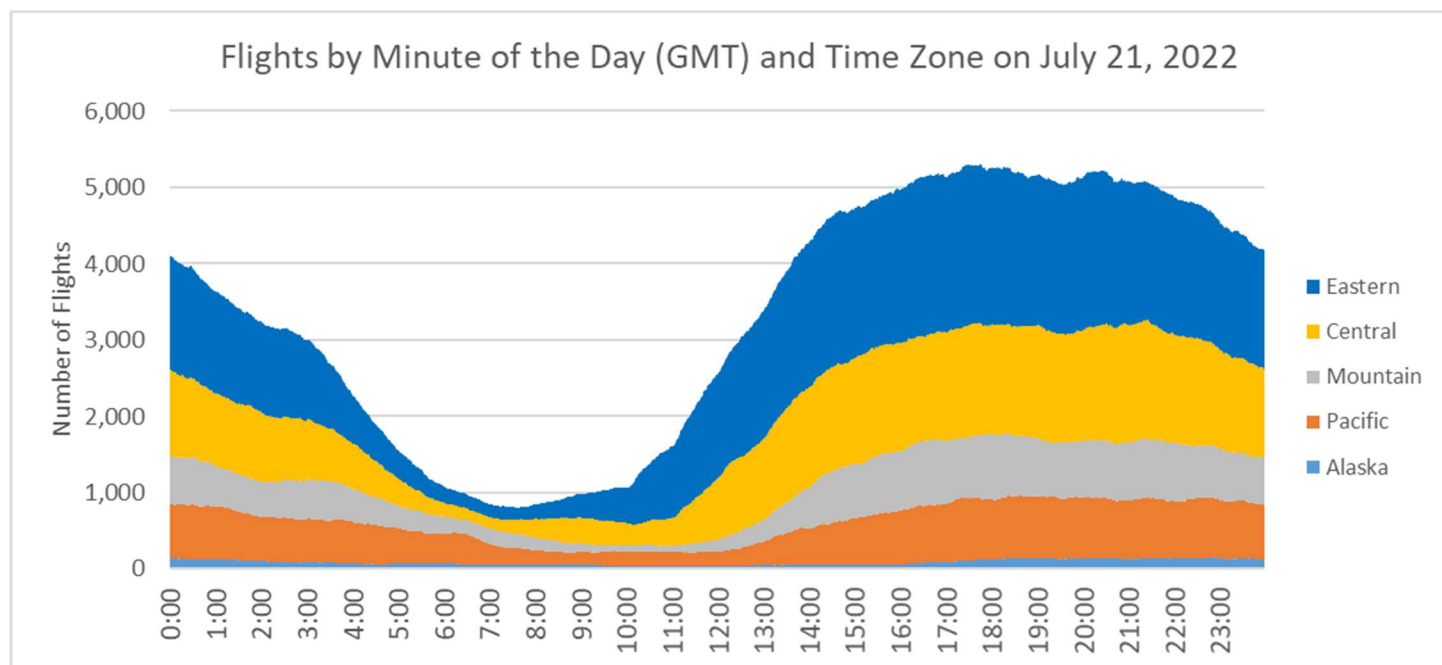
Source: Federal Aviation Administration, Air Traffic Organization, Office of Performance Analysis (AJR-G), Operations Network (OPSNET), November 7, 2022.

## Number of IFR Flights at Any Given Minute during Peak Operational Times

### 5,000 Flights

Traffic flow management system (TFMS) flight data were used to determine the number of flights en route every minute of the day and by U.S. time zone on July 21, 2022. Peak operational times in the NAS range between 1500 GMT and 2200 GMT. During peak operational times in the NAS on that day, there were approximately **5,300** flights en route in the NAS every minute.

The figure below shows the average number of flights en route per minute and flights under air traffic control by time zone. The Eastern Time zone has the largest share of flights in the NAS on average and, in this analysis, also includes flights under air traffic control from Puerto Rico and Bermuda. The Pacific Time Zone category includes all west coast air traffic as well as oceanic operations controlled by Oakland center (ZOA), including Hawaii and Guam.

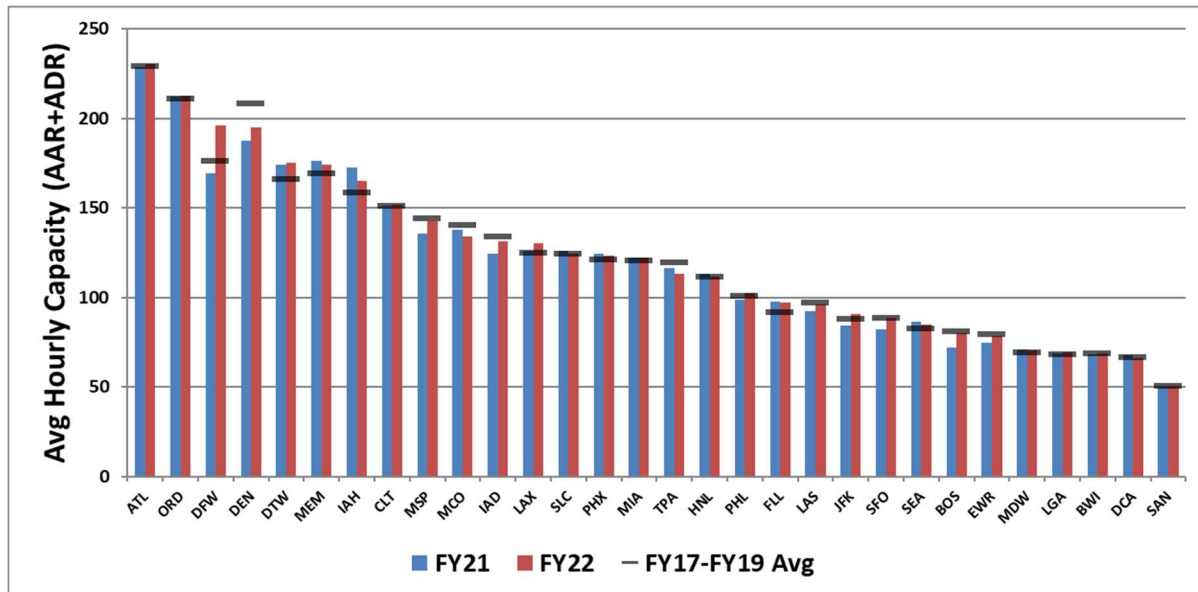


Source: Federal Aviation Administration, Air Traffic Organization, Office of Performance Analysis (AJR-G), February 10, 2023.

## Average Hourly Capacity (Called Rate) at Core 30 Airports

In general, airport capacity is determined by its runways and surrounding airspace. For the purpose of this report, capacity is represented by an airport's called rates for reportable hours. In FY2022, average hourly capacity across all Core 30 airports was 3,676. Note, airport capacity is not determined by circumstances such as the pandemic. Prior to the pandemic capacity averaged 3,643 operations per hour (table below).

In FY2022, the highest average hourly called rates were at Atlanta (ATL) and Chicago O'Hare (ORD). Each had an average called rate of over 200 operations per hour. The highest increases occurred at Dallas-Fort Worth (DFW) (up 15.7 percent) and Boston (BOS) (up 11 percent). (See, Appendix I for explanations of the Core 30 airport codes.)



AHC Across All Core 30 Airports			
FY17-19 Avg	FY21	FY20	%Change
3,643	3,611	3,676	1.8%

FY17-19				
Airport	Rank*	Avg	FY21	FY22
ATL	1	229	229	230
BOS	24	81	72	80
BWI	28	69	68	69
CLT	8	151	151	152
DCA	29	67	68	66
DEN	4	209	188	195
DFW	3	176	169	196
DTW	5	166	174	175
EWR	25	79	74	79
FLL	19	92	97	97
HNL	17	112	113	112
IAD	11	134	124	131
IAH	7	158	172	165
JFK	21	88	84	91
LAS	20	97	92	96

FY17-19				
Airport	Rank*	Avg	FY21	FY22
LAX	12	125	126	130
LGA	27	68	69	69
MCO	10	140	138	134
MDW	26	70	71	71
MEM	6	169	176	174
MIA	15	121	122	122
MSP	9	144	136	142
ORD	2	211	212	213
PHL	18	101	99	102
PHX	14	121	124	123
SAN	30	51	51	51
SEA	23	83	87	85
SFO	22	88	82	89
SLC	13	124	126	125
TPA	16	119	116	113

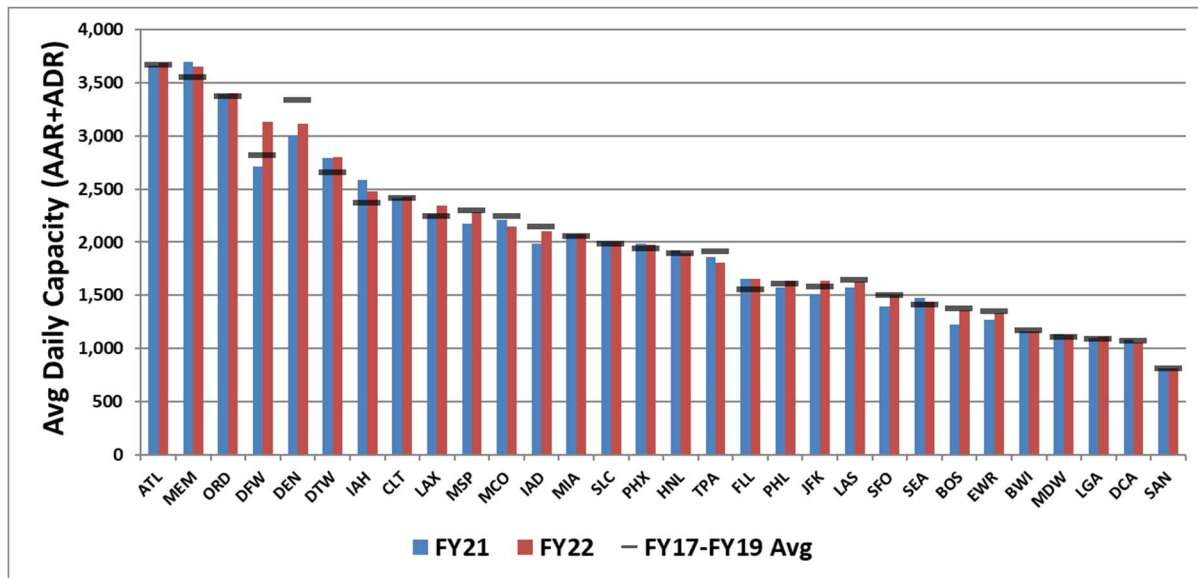
\*Ranked by FY2022 call rates.

Source: Federal Aviation Administration, Air Traffic Organization, Office of Performance Analysis (AJR-G), [Aviation System Performance Metrics \(ASPM\)](#), November 22, 2022.

## Average Daily Capacity (ADC) - Based on Called Rates at Core 30 Airports

In general, airport capacity is determined by its runways and surrounding airspace. For the purposes of this report, capacity is represented by the airport's called rates for reportable hours. Average daily capacity (ADC) is the ATO's official tracking method for determining an airport's capacity during a day. In FY2022, capacity across all Core 30 airports was 60,783 (table below). Airport capacity is not determined by circumstances such as the pandemic.

In FY2022, data for the Core 30 airports show that the highest ADCs were found at Atlanta (ATL), Memphis (MEM), Chicago (ORD), Dallas-Fort Worth (DFW), and Denver (DEN); each with an average of over 3,000 operations per day. Note, ADC is high for Memphis (MEM) because all 24 hours are reportable there. (See, Appendix I for explanations of the Core 30 airport codes.)



ADC Across All Core 30 Airports			
FY17-19 Avg	FY21	FY22	%Change
60,222	59,705	60,783	1.8%

FY17-19				
Airport	Rank*	Avg	FY21	FY22
ATL	1	3,664	3,662	3,684
BOS	24	1,381	1,222	1,356
BWI	26	1,171	1,162	1,165
CLT	8	2,414	2,419	2,425
DCA	29	1,068	1,081	1,058
DEN	5	3,336	3,003	3,118
DFW	4	2,821	2,709	3,134
DTW	6	2,657	2,789	2,800
EWB	25	1,349	1,265	1,335
FLL	18	1,557	1,656	1,653
HNL	16	1,898	1,923	1,900
IAD	12	2,147	1,987	2,102
IAH	7	2,375	2,583	2,478
JFK	20	1,580	1,512	1,635
LAS	21	1,650	1,571	1,629

FY17-19				
Airport	Rank*	Avg	FY21	FY22
LAX	9	2,246	2,263	2,346
LGA	28	1,093	1,101	1,111
MCO	11	2,243	2,206	2,146
MDW	27	1,112	1,136	1,128
MEM	2	3,556	3,697	3,655
MIA	13	2,054	2,078	2,075
MSP	10	2,302	2,171	2,279
ORD	3	3,376	3,392	3,403
PHL	19	1,610	1,576	1,637
PHX	15	1,942	1,988	1,973
SAN	30	809	812	811
SEA	23	1,409	1,471	1,438
SFO	22	1,503	1,392	1,505
SLC	14	1,986	2,015	1,993
TPA	17	1,910	1,863	1,811

\*Ranked by FY2022 daily capacity.

Source: Federal Aviation Administration, Air Traffic Organization, Office of Performance Analysis (AJR-G), [Aviation System Performance Metrics \(ASPM\)](#), November 22, 2022.

## Section 3. NAS Delay, Diversions, Go-Arounds, and Cancellations

Only flights departing from or arriving at their destination at least 15 minutes late are counted as a NAS system delay. The charts that appear below are based on OPSNET numbers, ATO's official source for delay data. Many factors contribute to delay, with weather is the most frequently cited reason. Delay imposes stress on the NAS, air traffic controllers, passengers, and the economy.

Diversions occur when a flight is rerouted to a different airport than its original destination. This usually occurs due to convective weather. Other less frequent reasons for diversions are medical emergencies, security, issues with the aircraft, or issues with passengers or crewmembers.

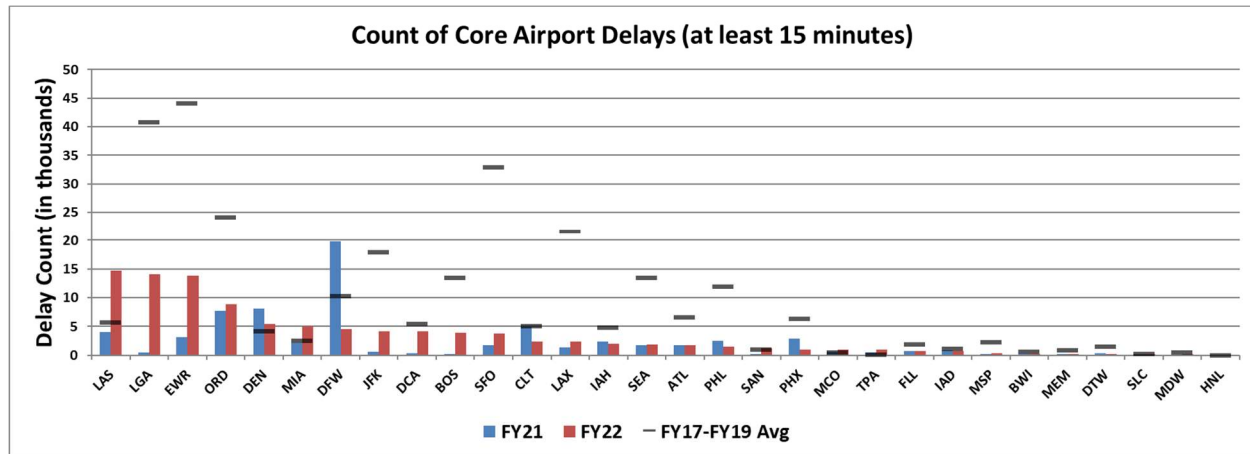
Go-Arounds occur when an aircraft is on approach to the runway but suddenly aborts the landing. This occurs if there is a sudden shift in the wind, an obstruction on the runway, or possibly, the aircraft inadvertently overshooting the runway. Go-arounds result in the aircraft returning to the landing queue to attempt another landing.

Cancellations can occur for numerous reasons due to weather, extensive delays in the system, equipment issues, etc. Air carriers cancel their own flights in response to these issues. Since the three-hour tarmac rule was imposed after 2010, more flights have been cancelled. This increase in cancellations means reductions in the number of recorded delays. During FY2020, the sudden decrease in the demand for air transportation due to the COVID-19 pandemic led to flight cancellations by airlines.

## Counts of NAS Delay at Core 30 Airports

During FY2022, OPSNET data show that the number of Core 30 airport departure delays of at least 15 minutes rose significantly, by 44.8 percent to 101,787 (table below). Since FY2017-FY2019, before the pandemic began, Core 30 airport departure delays fell by 63.9 percent from 281,899.

The graph and table below show, in FY2022, delays were highest at Las Vegas (LAS), LaGuardia (LGA), and Newark (EWR), each with 13,000 or more delays. Together these three airports accounted for about 40 percent of all Core 30 airport delays. All but six airports show decreases in delays during the pandemic (LAS, Denver (DEN), Miami (MIA), San Diego (SAN), Orlando (MCO), and Tampa (TPA)). (See, Appendix I for explanations of the Core 30 airport codes.)



Core 30 Total Delay Counts			
FY17-19 Avg	FY21	FY22	%Change
281,899	70,305	101,787	44.8%

		FY17-19		
Airport	Rank*	Avg	FY21	FY22
ATL	16	6,645	1,805	1,803
BOS	10	13,473	185	3,911
BWI	25	585	233	286
CLT	12	5,118	4,951	2,434
DCA	9	5,422	359	4,130
DEN	5	4,178	8,075	5,391
DFW	7	10,245	19,767	4,530
DTW	27	1,539	398	236
EWR	3	44,129	3,192	13,832
FLL	22	1,943	787	777
HNL	30	38	2	6
IAD	23	1,127	855	747
IAH	14	4,774	2,334	2,062
JFK	8	17,849	649	4,133
LAS	1	5,683	4,051	14,660

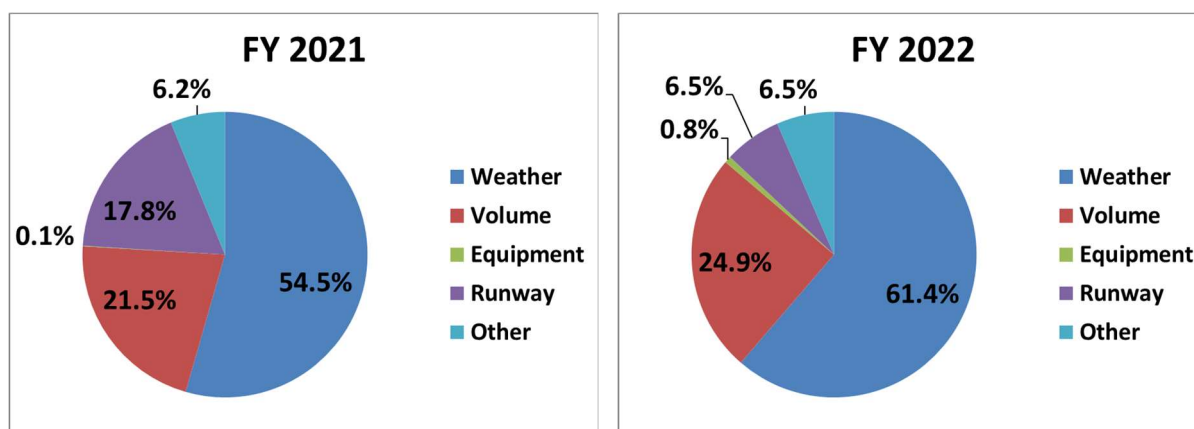
		FY17-19		
Airport	Rank*	Avg	FY21	FY22
LAX	13	21,631	1,404	2,412
LGA	2	40,819	480	14,028
MCO	20	425	650	998
MDW	29	449	78	192
MEM	26	812	166	237
MIA	6	2,579	2,092	5,058
MSP	24	2,316	245	409
ORD	4	24,115	7,790	8,918
PHL	17	11,946	2,468	1,478
PHX	19	6,387	2,888	1,038
SAN	18	934	259	1,245
SEA	15	13,432	1,715	1,844
SFO	11	32,947	1,758	3,794
SLC	28	278	213	231
TPA	21	80	456	967

\*Ranked by number of FY2022 delays.

Source: Federal Aviation Administration, Air Traffic Organization, Office of Performance Analysis (AJR-G), Operations Network (OPSNET), November 9, 2022.

## Delays by Category

The two charts below show the sources of delays at Core 30 airports by type of delay.



Note: System impact delays are delays assigned to causal facilities in OPSNET and are composed of delays due to TMIs, departure delays, and airborne delays. System impact delays are also the basis for delays by class and delays by cause in OPSNET. ([http://aspmhelp.faa.gov/index.php/OPSNET\\_Reports:Definitions\\_of\\_Variables](http://aspmhelp.faa.gov/index.php/OPSNET_Reports:Definitions_of_Variables))

Source: Federal Aviation Administration, Air Traffic Organization, Office of Performance Analysis (AJR-G), Operations Network (OPSNET), November 9, 2022.

## Total Cost of Delay

The total cost of flight delays is the sum of costs to airlines, passengers, lost demand, and indirect costs. FAA Office of Aviation Policy and Plans (APO) estimates for 2019 show the cost of delayed flights rose by 9.3 percent, from \$30.2 to \$33.0 billion, an increase of \$2.8 billion. Most of this rise was due to an increase in the impact of delays to passengers, from \$16.4 to \$18.1 billion, a \$1.7 billion difference. Between 2012 and 2019, the total cost of delays rose from \$19.2 to \$33.0 billion, an increase of \$13.8 billion. The cost of delays to passengers accounted for \$8.4 billion of this increase.

\$Billions	2012	2013	2014	2015	2016	2017	2018	2019*
Airlines <sup>1</sup>	5.7	6.0	5.8	5.8	5.6	6.4	7.7	8.3
Passengers <sup>2</sup>	9.7	11.0	10.5	13.3	13.3	14.8	16.4	18.1
Lost Demand <sup>3</sup>	1.3	1.4	1.4	1.8	1.8	2.0	2.2	2.4
Indirect <sup>4</sup>	2.5	2.7	2.6	3.1	3.0	3.4	3.9	4.2
<b>Total</b>	<b>19.2</b>	<b>21.1</b>	<b>20.3</b>	<b>24.0</b>	<b>23.7</b>	<b>26.6</b>	<b>30.2</b>	<b>33.0</b>

\*Estimates for CY2020 are not yet available.

Notes:

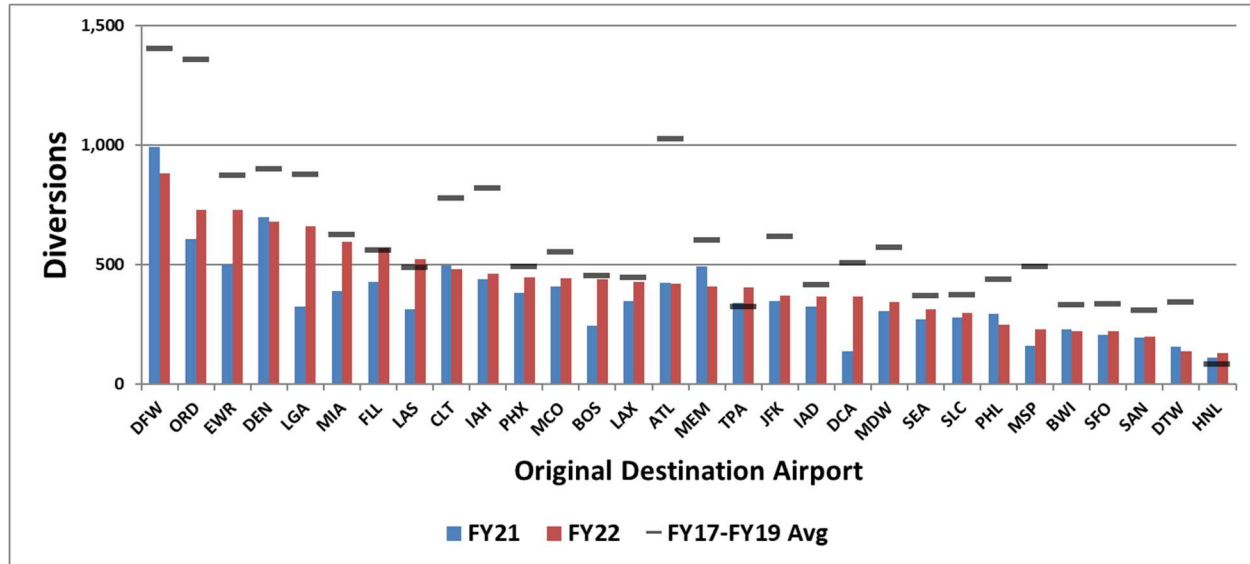
- Airlines** (cost of delay to airlines): Increased expenses for crew, fuel, maintenance, etc.
- Passengers** (cost of delay to passengers): Time lost due to schedule buffer, delayed flights, flight cancellations, and missed connections.
- Lost Demand** (cost of passenger decisions to avoid future air travel): Estimated welfare loss incurred by passengers who avoid future air travel as the result of delays.
- Indirect** (indirect cost of delay): Other business sectors depend on air travel for transportation. Air travel delays impact these sectors by increasing costs in terms of dollars and time.

Source: Federal Aviation Administration, Office of Aviation Policy and Plans, Forecast and Performance Analysis Division (APO-100), July 8, 2020.

## Diversions at Core 30 Airports

The airports reported below are the original intended destinations for the diverted aircraft. Increases in the number of diversions can indicate capacity issues at the airport due to weather, construction, or volume. Over all Core 30 airports, the number of diversions rose by 13.7 percent in FY2022; however, since before the start of the pandemic, Core 30 airport diversions fell by 28.4 percent from 17,779 (table below).

Airports with the highest increases in diversions were Washington National (DCA) (with 162.6 percent), LaGuardia (LGA) (104 percent), and Boston (BOS) (79.8 percent). Airports with the highest decreases were Memphis (MEM) (-17 percent), Philadelphia (PHL) (-15.4 percent), and Detroit (DTW) (-12.1 percent). All but two airports show decreases in diversions since before the pandemic (Honolulu (HNL), Tampa (TPA)) (graph and table below). (See, Appendix I for explanations of the Core 30 airport codes.)



Core 30 Total Diversions			
FY17-19 Avg	FY21	FY22	%Change
17,779	10,844	12,737	17.5%

		FY17-19		
Airport	Rank*	Avg	FY21	FY22
ATL	15	1,025	424	419
BOS	13	454	243	437
BWI	26	331	228	222
CLT	9	778	496	481
DCA	20	507	139	365
DEN	4	902	698	679
DFW	1	1,404	993	881
DTW	29	344	157	138
EW	3	874	499	727
FLL	7	562	429	570
HNL	30	85	112	131
IAD	19	415	324	368
IAH	10	819	438	460
JFK	18	618	348	369
LAS	8	488	314	524

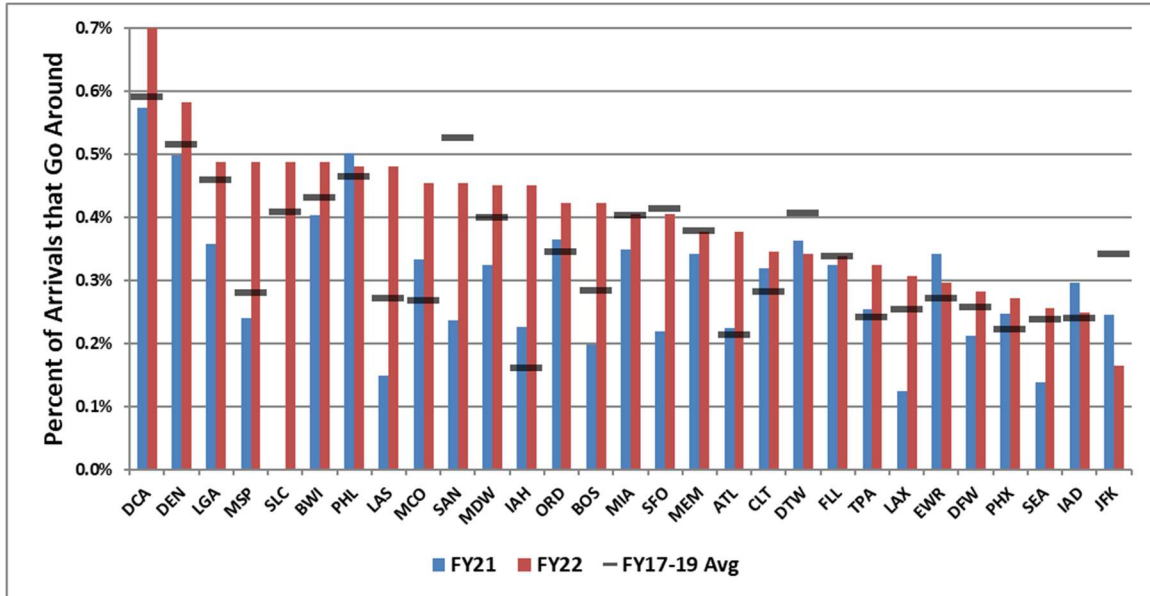
		FY17-19		
Airport	Rank*	Avg	FY21	FY22
LAX	14	445	349	426
LGA	5	876	324	661
MCO	12	552	407	443
MDW	21	574	305	343
MEM	16	603	494	410
MIA	6	628	388	595
MSP	25	493	162	228
ORD	2	1,359	607	729
PHL	24	439	293	248
PHX	11	492	381	447
SAN	28	311	195	200
SEA	22	369	270	314
SFO	27	336	208	221
SLC	23	374	279	298
TPA	17	325	340	403

\*Ranked by number of FY2022 diversions.

Source: Federal Aviation Administration, Air Traffic Organization, Office of Performance Analysis (AJR-G), [Aviation System Performance Metrics \(ASPM\)](#), November 23, 2022.

## Go-Arounds at Core 30 Airports

Go-arounds as a percent of arrival operations at each Core 30 airport (except Honolulu) appear below. In FY2021, go-arounds at each Core 30 airport, did not exceed 0.6 percent. Average go-arounds as a percent of arrivals across all Core 30 airports rose to about 0.4 percent (tables and graph below). This occurred mainly due to a large increase in go-arounds relative to a smaller increase in arrival operations. (The estimates presented here are based on ASPM and CountOps data.) (See, Appendix I for explanations of the Core 30 airport codes.)



Core 30 Go Arounds As Percent of Arrivals			
FY17-19 Avg	FY21	FY22	%Change
0.3%	0.3%	0.4%	24.9%

FY17-19			
Airport	Avg	FY21	FY22
ATL	0.2%	0.2%	0.4%
BOS	0.3%	0.2%	0.4%
BWI	0.4%	0.4%	0.5%
CLT	0.3%	0.3%	0.3%
DCA	0.6%	0.6%	0.8%
DEN	0.5%	0.5%	0.6%
DFW	0.3%	0.2%	0.3%
DTW	0.4%	0.4%	0.3%
EWB	0.3%	0.3%	0.3%
FLL	0.3%	0.3%	0.3%
IAD	0.2%	0.3%	0.2%
IAH	0.2%	0.2%	0.5%
JFK	0.3%	0.2%	0.2%
LAS	0.3%	0.1%	0.5%
LAX	0.3%	0.1%	0.3%

FY17-19			
Airport	Avg	FY21	FY22
LGA	0.5%	0.4%	0.5%
MCO	0.3%	0.3%	0.5%
MDW	0.4%	0.3%	0.5%
MEM	0.4%	0.3%	0.4%
MIA	0.4%	0.3%	0.4%
MSP	0.3%	0.2%	0.5%
ORD	0.3%	0.4%	0.4%
PHL	0.5%	0.5%	0.5%
PHX	0.2%	0.2%	0.3%
SAN	0.5%	0.2%	0.5%
SEA	0.2%	0.1%	0.3%
SFO	0.4%	0.2%	0.4%
SLC	0.4%	NA	0.5%
TPA	0.2%	0.3%	0.3%

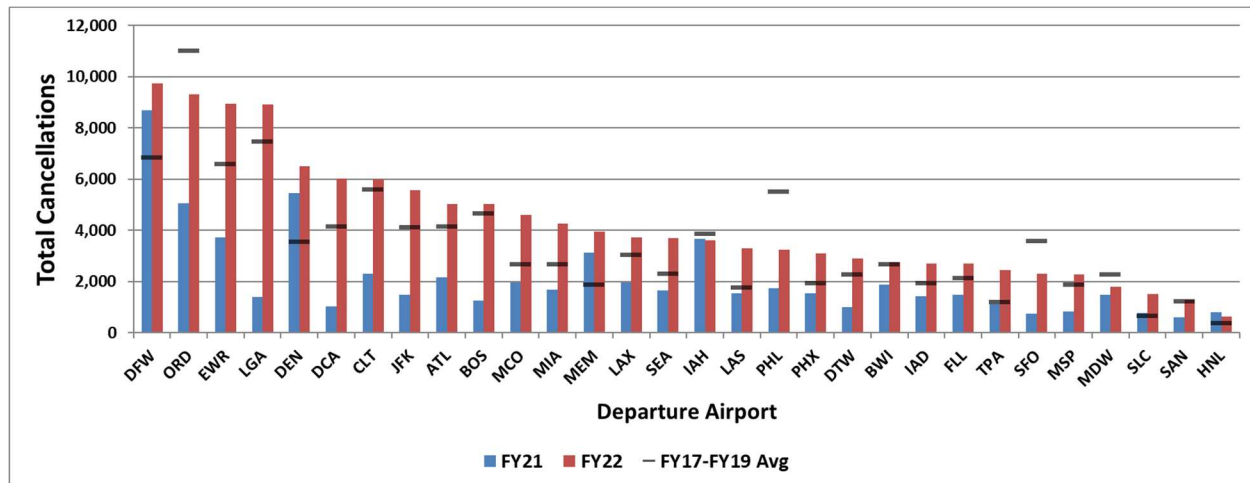
\* FY2021 data for Salt Lake City (SLC) are not yet available.

Sources: Go-arounds: Federal Aviation Administration, Air Traffic Organization, Office of Performance Analysis (AJR-G), [Aviation System Performance Metrics \(ASPM\)](#), November 28, 2022; Arrivals: Federal Aviation Administration, Air Traffic Organization, Office of Performance Analysis (AJR-G), [CountOps](#), November 28, 2022.

## Cancellations at Core 30 Airports

During FY2022, flight departure cancellations at Core 30 airports almost doubled, increasing by 100.6 percent. Cancellations rose at every airport, except Houston (IAH) and Honolulu (HNL) (table below). A year earlier, cancellations almost fell by almost 70 percent, due to the impact of the COVID-19 pandemic on air travel. Cancellations may be due to weather, system delays, equipment issues, or other reasons, such as the pandemic.

During FY2022, the airports with the highest number of cancellations were Dallas-Fort Worth (DFW), Chicago O'Hare (ORD), Newark (EWR), and LaGuardia (LGA); each with over 8,000 cancellations. Five airports show decreases in cancellations since before the pandemic (Chicago O'Hare (ORD), Houston (IAH), Philadelphia (PHL), San Francisco (SFO), and Chicago Midway (MDW)) (table and graph below). (See, Appendix I for explanations of the Core 30 airport codes.)



Core 30 Total Cancellations			
FY17-19 Avg	FY21	FY22	%Change
104,156	63,779	127,963	100.6%

		FY17-19		
Airport	Rank*	Avg	FY21	FY22
ATL	9	4,153	2,173	5,040
BOS	10	4,667	1,273	5,033
BWI	21	2,674	1,888	2,769
CLT	7	5,597	2,324	6,009
DCA	6	4,160	1,034	6,032
DEN	5	3,551	5,456	6,509
DFW	1	6,856	8,697	9,742
DTW	20	2,294	1,018	2,892
EWR	3	6,578	3,733	8,944
FLL	23	2,144	1,486	2,695
HNL	30	384	800	624
IAD	22	1,927	1,420	2,708
IAH	16	3,863	3,666	3,615
JFK	8	4,134	1,485	5,568
LAS	17	1,771	1,550	3,294

		FY17-19		
Airport	Rank*	Avg	FY21	FY22
LAX	14	3,058	1,956	3,737
LGA	4	7,473	1,411	8,930
MCO	11	2,666	1,964	4,596
MDW	27	2,293	1,488	1,797
MEM	13	1,891	3,132	3,951
MIA	12	2,667	1,694	4,261
MSP	26	1,873	845	2,291
ORD	2	11,030	5,068	9,320
PHL	18	5,501	1,729	3,249
PHX	19	1,952	1,543	3,105
SAN	29	1,228	620	1,277
SEA	15	2,315	1,647	3,703
SFO	25	3,586	759	2,298
SLC	28	659	788	1,517
TPA	24	1,207	1,132	2,457

Source: Federal Aviation Administration, Air Traffic Organization, Office of Performance Analysis (AJR-G), [Aviation System Performance Metrics \(ASPM\)](#), November 25, 2022.

## Section 4. Traffic Management Initiatives

Traffic Management Initiatives (TMIs) are programs and tools that ATC may use to manage air traffic. These initiatives can take a number of forms, depending on the need and situation. Some TMIs are used to manage excess demand or a lowered acceptance rate at a particular airport. Other TMIs are used to manage traffic issues in the en route environment usually caused by convective weather. The TMIs reported in this report include:

**Ground Delay Programs (GDP)**

**Ground stops (GS)**

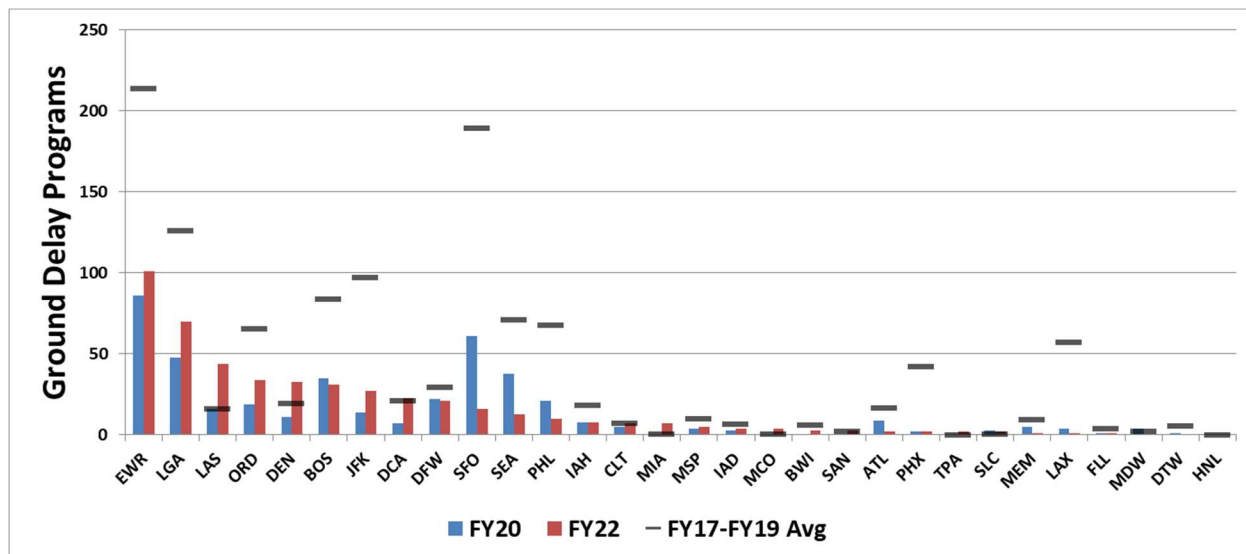
**Airspace Flow Programs (AFP)**

**Holdings**

## Ground Delay Programs at Core 30 Airports

A ground delay program (GDP) is a TMI where aircraft are delayed at their departure airport in order to reconcile demand with capacity at their arrival airport. GDPs are airport-specific, therefore, each GDP is reported for a particular airport. During FY2022, GDPs increased by 49.4 percent across all Core 30 airports, from 318 to 475. Before the pandemic (FY2017-2019), the average number of GDPs was 1,190 (table below).

In FY2022, Newark (EWR), LaGuardia (LGA), and Las Vegas (LAS) had the highest number of GDPs. Together, these three airports accounted for almost 50 percent of all GDPs at Core 30 airports. Since before the pandemic (FY2017-2019), GDPs rose at eight Core 30 airports (DCA, DEN, LAS, MCO, MIA, SAN, SLC, and TPA (graph and table below)). (See, Appendix I for explanations of the Core 30 airport codes.)



Total Core 30 GDPs			
FY17-19 Avg	FY21	FY22	%Change
1,190	318	475	49.4%

FY17-19			
Airport	Avg	FY21	FY22
ATL	17	5	2
BOS	84	1	31
BWI	6	3	3
CLT	7	15	7
DCA	21	3	23
DEN	19	57	33
DFW	29	72	21
DTW	5	0	0
EWR	214	26	101
FLL	4	0	1
HNL	0	0	0
IAD	7	6	4
IAH	18	16	8
JFK	97	7	27
LAS	16	13	44

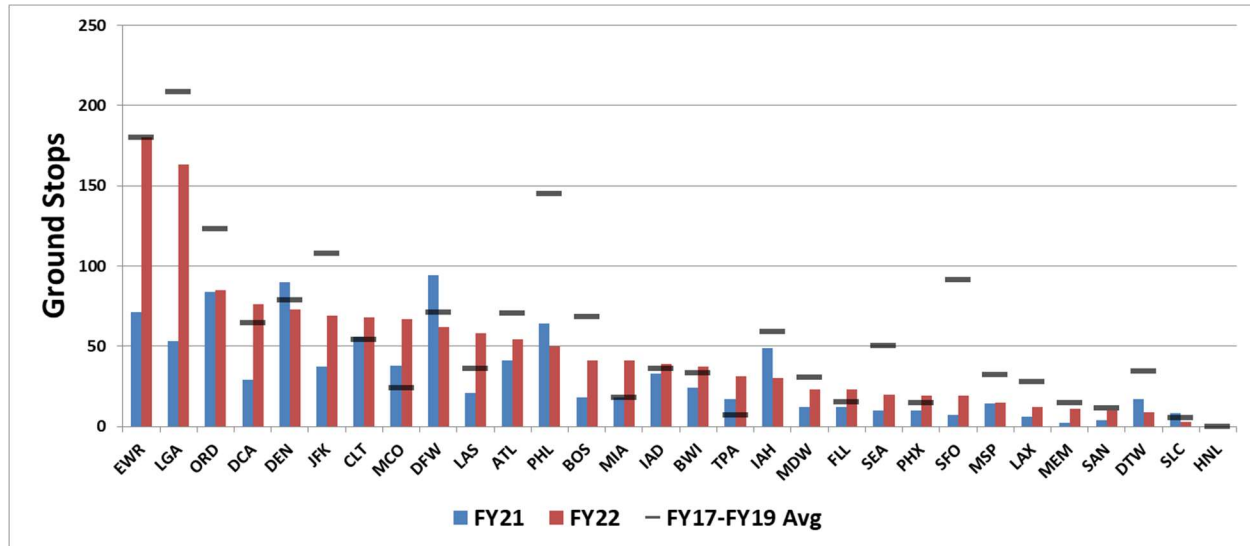
FY17-19			
Airport	Avg	FY21	FY22
LAX	57	0	1
LGA	126	3	70
MCO	1	3	4
MDW	2	0	0
MEM	10	1	1
MIA	1	1	7
MSP	10	4	5
ORD	66	39	34
PHL	68	24	10
PHX	42	3	2
SAN	2	0	3
SEA	71	6	13
SFO	190	9	16
SLC	0	0	2
TPA	0	1	2

Source: Federal Aviation Administration, Air Traffic Organization, Office of Performance Analysis (AJR-G), Operations Network (OPSNET), November 17, 2022.

## Ground Stops at Core 30 Airports

Ground stops are the most restrictive form of TMI because they hold all aircraft, within the scope of the ground stop, at their departure airports until conditions at the destination airport allow for their arrival. Ground stops only affect arrivals to a specific airport (not departures) and, like GDPs, are airport-specific. During FY2022, the number of ground stops increased by 47.8 percent across all Core 30 airports, from 939 to 1,388. Before the pandemic (FY2017-2019), the average number of ground stops was 1,716 (table below).

FY2022, Washington National (DCA), LaGuardia (LGA), and Chicago O'Hare (ORD) had the highest number of ground stops. Since before the pandemic (FY2017-2019), ground stops rose at ten Core-30 airports (BWI, CLT, DCA, FLL, IAD, LAS, MCO, MIA, PHX, and TPA) (graph and table below). (See, Appendix I for explanations of the Core 30 airport codes.)



Total Core 30 Ground Stops			
FY17-19 Avg	FY21	FY22	%Change
1,716	939	1,388	47.8%

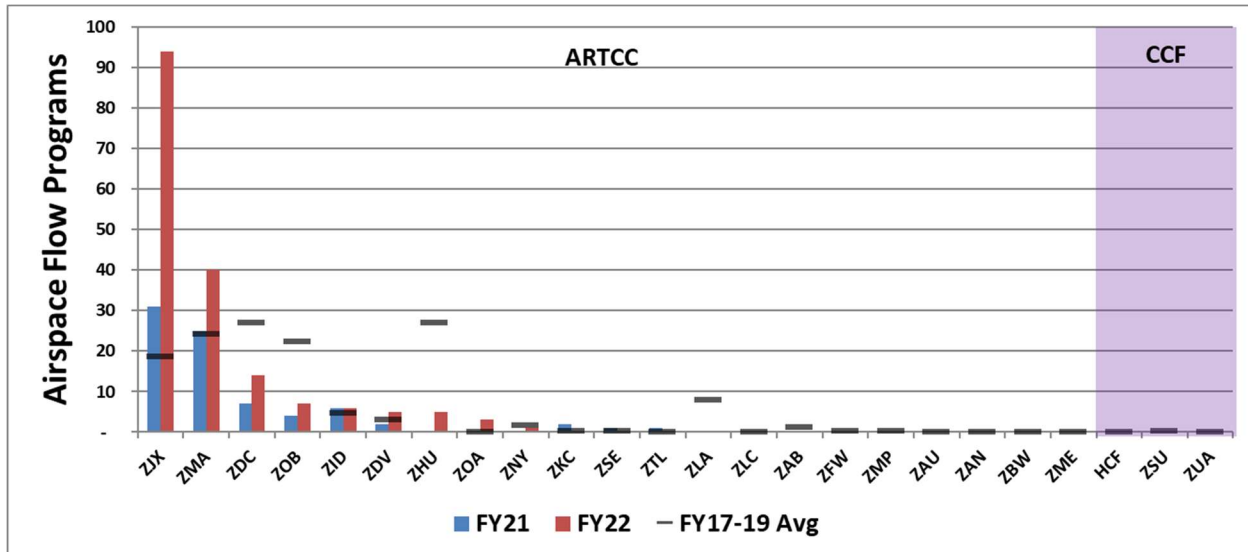
FY17-19				FY17-19			
Airport	Avg	FY21	FY22	Airport	Avg	FY21	FY22
ATL	71	41	54	LAX	28	6	12
BOS	68	18	41	LGA	208	53	163
BWI	34	24	37	MCO	24	38	67
CLT	54	56	68	MDW	31	12	23
DCA	65	29	76	MEM	15	2	11
DEN	79	90	73	MIA	18	18	41
DFW	71	94	62	MSP	32	14	15
DTW	34	17	9	ORD	123	84	85
EWR	180	71	180	PHL	145	64	50
FLL	15	12	23	PHX	15	10	19
HNL	0	0	0	SAN	11	4	10
IAD	36	33	39	SEA	51	10	20
IAH	59	49	30	SFO	91	7	19
JFK	108	37	69	SLC	6	8	3
LAS	36	21	58	TPA	7	17	31

Source: Federal Aviation Administration, Air Traffic Organization, Office of Performance Analysis (AJR-G), [Operations Network \(OPSNET\)](#), November 17, 2022.

## Airspace Flow Programs by Center

Imagine a line drawn in space in association with a constraint, usually convective weather. Under an airspace flow program, any flights filed that crosses the line (usually only in one direction) are assigned an expected departure clearance time (EDCT) by air traffic managers through the flow constrained area, to ensure that it arrives at the line, or “boundary,” at a time when it can be accommodated. In FY2022, there were 175 airspace flow programs (AFP) imposed by air traffic managers versus 79 in FY2021, an increase of 121.5 percent. The main reasons for the 175 AFPs in FY2022 were weather conditions and traffic volume. Before the pandemic (FY2017-2019), the average number of AFPs was 140 (table below).

In FY2022, AFPs mainly affected Jacksonville (ZJX) and Miami (ZMA). Together, these centers accounted for 134 of the 175 AFPs. Since before the pandemic (FY2017-2019), the largest increase in AFPs occurred at Jacksonville (ZJX) (graph and table below). (These estimates are based on National Traffic Management Log (NTML) data.) (See, Appendix I for explanations of the ARTCC and CCF codes.)



\* Data for CCF JCF are not available.

Total Centers Air Flow Programs			
FY17-19 Avg	FY21	FY22	%Change
140	79	175	121.5%

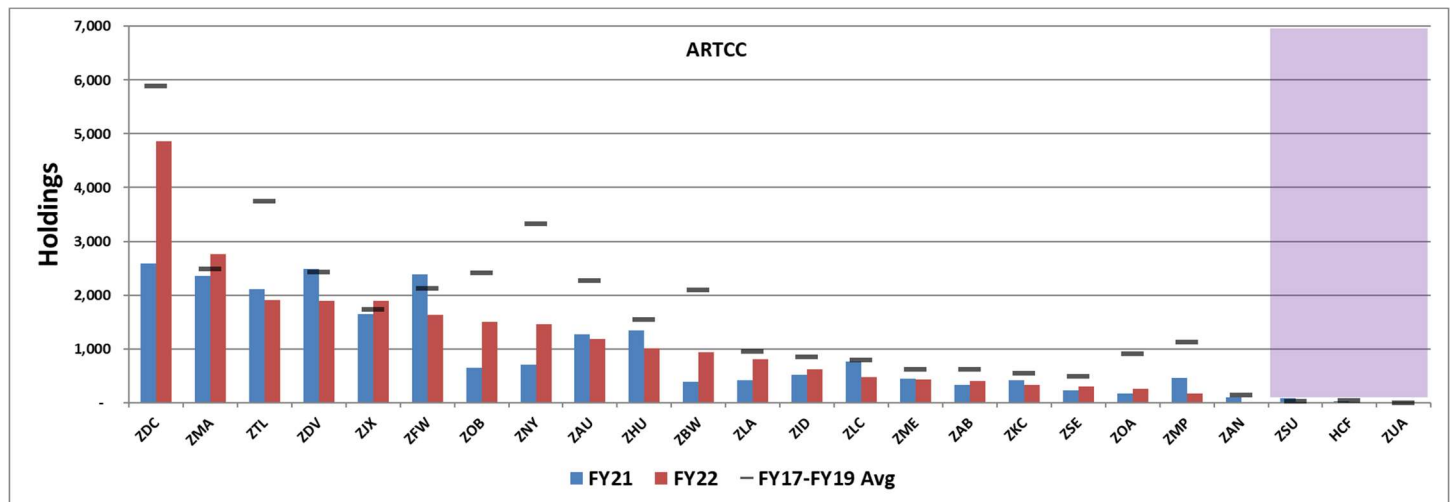
FY17-19				FY17-19			
Center	Avg	FY21	FY22	Center	Avg	FY21	FY22
HCF	0	0	0	ZLA	8	0	0
ZAB	1	0	0	ZLC	0	0	0
ZAN	0	0	0	ZMA	24	25	40
ZAU	0	0	0	ZME	0	0	0
ZBW	0	0	0	ZMP	0	0	0
ZDC	27	7	14	ZNY	2	0	1
ZDV	3	2	5	ZOA	0	0	3
ZFW	0	0	0	ZOB	22	4	7
ZHU	27	0	5	ZSE	0	1	0
ZID	5	6	6	ZSU	0	0	0
ZJX	19	31	94	ZTL	0	1	0
ZKC	0	2	0	ZUA	0	0	0

Source: Federal Aviation Administration, Air Traffic Organization, Technical Operations (AJW), National Traffic Management Log (NTML), January 10, 2023.

## Holdings by Center

A holding occurs when an aircraft is deliberately delayed en route by flying in a repeating rotational pattern. They are typically implemented when there is traffic congestion or convective weather at the destination airport or an adjacent facility. During FY2022, there were 24,813 holdings, rising 13.5 percent from FY2021. Before the pandemic (FY2017-2019), the average number of holdings was far higher at 37,166 (table below).

During FY2022, OPSNET data shows among Air Route Traffic Control Centers (ARTCC), the highest numbers of airborne holdings occurred in DC (ZDC), Miami (ZMA), Atlanta (ZTL), and Denver (ZDV). Holdings slightly surpassed pre-pandemic levels at two Centers (Miami (ZMA) and Jacksonville (ZJX)) (graph and table below). (See, Appendix I for explanations of the ARTCC and combined control facility (CCF) codes.)



\* Data for CCF JCF are not available.

Total Center Flight Holdings			
FY17-19 Avg	FY21	FY22	%Change
37,166	21,860	24,813	13.5%

Center	FY17-19 Avg	FY21	FY22
ZAB	611	322	404
ZAN	146	103	0
ZAU	2,270	1,274	1,188
ZBW	2,093	389	939
ZDC	5,894	2,585	4,855
ZDV	2,427	2,480	1,899
ZFW	2,129	2,384	1,634
ZHU	1,552	1,347	1,008
ZID	846	513	611
ZJX	1,738	1,648	1,894
ZKC	553	410	325
ZLA	945	409	811

Center	FY17-19 Avg	FY21	FY22
ZLC	789	769	480
ZMA	2,492	2,359	2,761
ZME	619	438	424
ZMP	1,122	453	173
ZNY	3,330	707	1,453
ZOA	912	176	253
ZOB	2,409	640	1,503
ZSE	482	234	297
ZTL	3,748	2,106	1,901
ZSU	26	84	0
HCF	36	30	0
ZUA	0	0	0

Source: Federal Aviation Administration, Air Traffic Organization, Office of Performance Analysis (AJR-G), Operations Network (OPSNET), November 16, 2022.

## Section 5. Safety Metrics

The U.S. national airspace system is the safest air transportation system in the world. This report presents metrics used to measure the safety of the NAS:

**Runway Incursions**

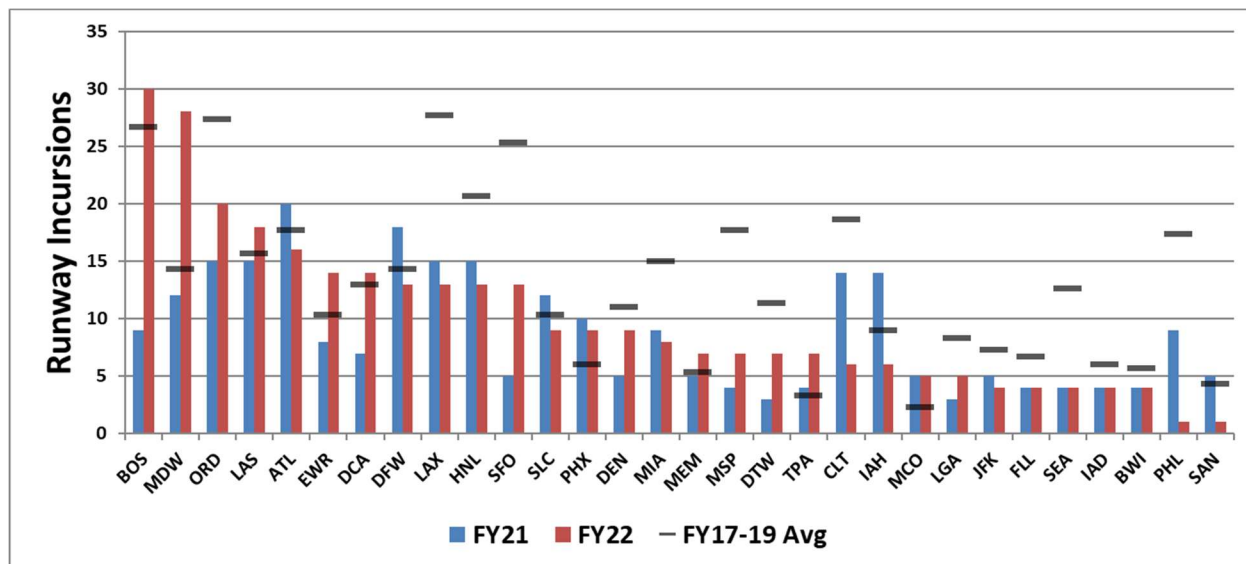
**Incursions by Type**

**Loss of Standard Separation Count**

## Runway Incursions at Core 30 Airports

A runway incursion is any occurrence involving the incorrect presence of an aircraft, vehicle, or person on the protected area of a surface designated for the landing and takeoff of aircraft. Across all Core 30 airports, the number of runway incursions rose from 262 in FY2021 to 299 in FY2022. Before the pandemic (FY2017-2019), the average annual number of runway incursions was higher, at 391 (table below).

In FY2022, the highest numbers of runway incursions occurred at Boston (BOS) and Chicago Midway (MDW). The number of runway incursions exceeded pre-pandemic levels at nine airports, most notably at Chicago Midway (MDW) (graph and table below). Incursions by airport and by type appear on the next page. (See, Appendix I for explanations of the Core 30 airport codes.)



Core 30 Total Runway Incursions			
FY17-19 Avg	FY21	FY22	%Change
391	262	299	14.1%

FY17-19				FY17-19			
Airport	Avg	FY21	FY22	Airport	Avg	FY21	FY22
ATL	18	20	16	LAX	28	15	13
BOS	27	9	30	LGA	8	3	5
BWI	6	4	4	MCO	2	5	5
CLT	19	14	6	MDW	14	12	28
DCA	13	7	14	MEM	5	5	7
DEN	11	5	9	MIA	15	9	8
DFW	14	18	13	MSP	18	4	7
DTW	11	3	7	ORD	27	15	20
EWB	10	8	14	PHL	17	9	1
FLL	7	4	4	PHX	6	10	9
HNL	21	15	13	SAN	4	5	1
IAD	6	4	4	SEA	13	4	4
IAH	9	14	6	SFO	25	5	13
JFK	7	5	4	SLC	10	12	9
LAS	16	15	18	TPA	3	4	7

\*Honolulu is coded as HNL or HCF in the source data.

Source: Federal Aviation Administration, Air Traffic Organization, Safety and Technical Training, Office of Policy and Performance (AJI-3), unpublished Airborne Loss Event data, December 6, 2022.

***Incursions by Type at Core 30 Airports, FY2022***

<b>Airport</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>Totals</b>
ATL	0	0	8	8	0	16
BOS	0	0	20	10	0	30
BWI	0	0	1	3	0	4
CLT	0	0	5	1	0	6
DCA	0	0	8	6	0	14
DEN	0	0	7	2	0	9
DFW	0	0	9	4	0	13
DTW	0	0	1	6	0	7
EWB	0	0	12	2	0	14
FLL	0	0	3	1	0	4
HNL	0	0	6	7	0	13
IAD	0	0	2	2	0	4
IAH	0	1	3	2	0	6
JFK	0	0	3	1	0	4
LAS	0	0	6	12	0	18
LAX	0	0	11	2	0	13
LGA	0	0	4	1	0	5
MCO	0	0	2	3	0	5
MDW	1	0	14	13	0	28
MEM	0	0	4	3	0	7
MIA	0	0	6	2	0	8
MSP	0	0	4	3	0	7
ORD	0	0	7	13	0	20
PHL	0	0	1	0	0	1
PHX	0	0	5	4	0	9
SAN	0	0	0	1	0	1
SEA	0	0	3	1	0	4
SFO	0	0	8	5	0	13
SLC	0	0	5	4	0	9
TPA	0	0	2	5	0	7

**Category A** - A serious incident in which a collision was narrowly avoided.

**Category B** - An incident in which separation decreases and there is a significant potential for collision, which may result in a time critical corrective/evasive response to avoid a collision.

**Category C** - An incident characterized by ample time and/or distance to avoid a collision.

**Category D** - An incident that meets the definition of a runway incursion such as incorrect presence of a single vehicle/person/aircraft on the protected area of a surface designated for the landing and take-off of aircraft of aircraft but with no immediate safety consequences.

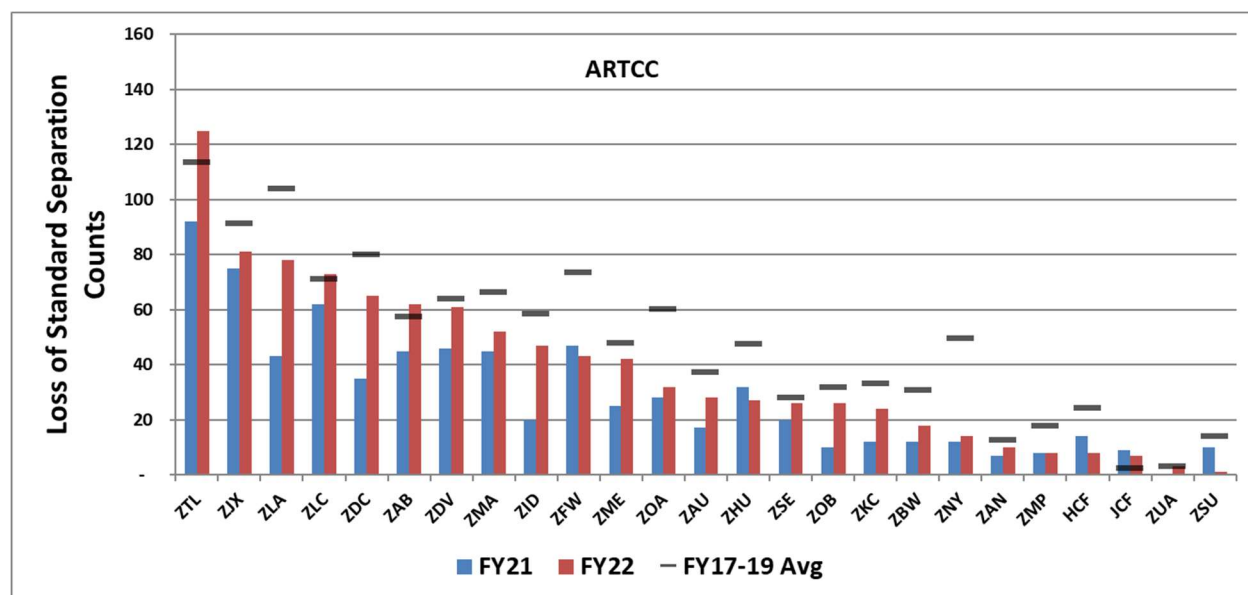
**Category E** - An incident in which insufficient or conflicting evidence of the event precludes assigning another category.

Source: Federal Aviation Administration, Air Traffic Organization, Safety and Technical Training, Office of Policy and Performance (AJI-3), unpublished Airborne Loss Event data, December 6, 2022.

## Loss of Standard Separation Count, by Center

Standard separation is a specified separation minima between airborne aircraft in controlled airspace. Breaches of such minima are based on airborne loss event data. Losses of standard separation are reported by Air Route Traffic Control Center (ARTCC). Across all centers, the number of losses of standard separation rose from 726 in FY2021 to 961 in FY2022. Before the pandemic (FY2017-2019), the average annual number of losses of standard separation was higher at 1,221 (table below). This means losses of standard separation remain below pre-pandemic levels.

In FY2022, the centers with the highest losses of standard of separation were Atlanta (ZTL), Jacksonville (ZJX), and Los Angeles (ZLA). The number of losses of standard of separation exceeded pre-pandemic levels at three centers (Atlanta (ZTL), Salt Lake City (ZTL), and Albuquerque (ZAB)) and one CCF (Joshua Tree (JCF)) (graph and table below). (See, Appendix I for explanations of the ARTCC and combined control facilities (CCF).)



Total Losses of Standard Separation			
FY17-19 Avg	FY21	FY22	%Change
1,221	726	961	32.4%

FY17-19			
Center	Avg	FY21	FY22
HCF	24	14	8
JCF	2	9	7
ZAB	57	45	62
ZAN	13	7	10
ZAU	37	17	28
ZBW	31	12	18
ZDC	80	35	65
ZDV	64	46	61
ZFW	74	47	43
ZHU	48	32	27
ZID	59	20	47
ZJX	91	75	81
ZKC	33	12	24

FY17-19			
Center	Avg	FY21	FY22
ZLA	104	43	78
ZLC	71	62	73
ZMA	66	45	52
ZME	48	25	42
ZMP	18	8	8
ZNY	50	12	14
ZOA	60	28	32
ZOB	32	10	26
ZSE	28	20	26
ZSU	14	10	1
ZTL	114	92	125
ZUA	3	0	3

Source: Federal Aviation Administration, Air Traffic Organization, Safety and Technical Training, Office of Policy and Performance (AJI-3), unpublished Airborne Loss Event data, December 6, 2022.

## **Section 6. Other ATO Topics**

There are a variety of other aspects of the NAS which are of special interest. This report presents the following:

**Flight Service Stations**

**Commercial Space Launch Activity**

## Flight Service Stations

Flight services are delivered nationwide through certified professional controllers in Alaska and the contiguous United States, Hawaii, Puerto Rico. Services include preflight weather briefings, flight planning, inflight advisory services, search and rescue (SAR), and processing notices to air missions (NOTAMs). Self-briefing and other automated services are provided through an online web portal. Web services include interactive graphical capabilities to view a wide range of weather and aeronautical information, flight planning, activating and closing flight plans, and more. Pilots may also access automated voice services to receive current and forecast conditions at specific airports, and receive updates for adverse conditions, including TFRs.

Flight Service also delivers the FAA Weather Camera Program. This program features an expanding network of nearly 300 camera sites in Alaska, Colorado, and Montana (other sites, including Hawaii, coming soon) and over 175 sites hosted by NAV Canada, Canada's civil air navigation service provider. The weather cameras website provides pilots with additional information for improved situational awareness and decision-making. On the website, pilots can see current images at specific locations, compare the images to clear day views, or playback a loop of past images to establish weather trends. The website also delivers a variety of safety of flight information including adverse conditions, current and forecast conditions, pilot reports, and aeronautical information.

<b>ALASKA FSS</b>	<b>Barrow FSS (BRW)</b> <b>Cold Bay FSS (CDB)</b> <b>Deadhorse FSS (SCC)</b> <b>Dillingham FSS (DLG)</b> <b>Fairbanks FSS (FAI)</b> <b>Homer FSS (HOM)</b> <b>Iliamna FSS (ILI)</b> <b>Juneau FSS (JNU)</b> <b>Kenai FSS (ENA)</b> <b>Ketchikan FSS (KTN)</b> <b>Kotzebue FSS (OTZ)</b> <b>McGrath FSS (MCG)</b> <b>Nome FSS (OME)</b> <b>Northway FSS (ORT)</b> <b>Palmer FSS (PAQ)</b> <b>Sitka FSS (SIT)</b> <b>Talkeetna FSS (TKA)</b>
<b>FEDERAL CONTRACT FSS</b>	<b>Leidos FCFSS Washington Hub (DCA)</b> <b>Leidos FCFSS Fort Worth Hub (FTW)</b>

**FAA Flight Services**

<b>FAA Facilities – Alaska Flight Service</b>							
Year	Pilot Briefs	Flight Plans Filed	Preflight Calls	Aircraft Contacts	Airport Advisories	NOTAMs Issued	Total SAR
FY 2017	94,553	194,641	52,504	485,847	305,915	135,226	3,662
FY 2018	89,592	210,626	52,200	521,048	325,140	158,003	4,869
FY 2019	92,070	209,024	52,980	542,550	327,130	166,848	6,924
FY 2020	71,570	141,492	39,031	400,181	243,844	166,954	3,021
FY 2021	67,999	151,946	37,339	445,942	280,499	180,364	3,099
FY 2022	66,580	167,969	36,111	456,727	292,734	166,065	2,736

<b>Federal Contract Flight Services</b>							
Year	Pilot Briefs	Flight Plans Filed	Preflight Calls	Inflight Contacts	Flight Data Calls	NOTAMs Issued	Total SAR
FY 2017	829,909	515,868	1,344,640	314,363	175,203	216,997	8,145
FY 2018	797,746	462,207	1,255,510	286,392	178,110	216,249	9,337
FY 2019	747,731	387,694	1,158,005	257,701	166,546	200,192	9,728
FY 2020	541,004	195,635	782,145	175,361	121,118	179,612	13,195
FY 2021	483,675	168,094	660,369	186,628	125,186	190,118	33,769
FY 2022	422,210	156,629	564,291	179,414	118,296	184,105	33,313

<b>Web Services/DUATs</b>		
Year	Pilot Briefs*	Flight Plans Filed
FY 2017	29,079,619	2,592,214
FY 2018	26,349,042	2,229,961
FY 2019	18,946,978	1,690,246
FY 2020	17,290,280	1,272,098
FY 2021	15,550,689	1,328,714
FY 2022	13,639,661	957,148

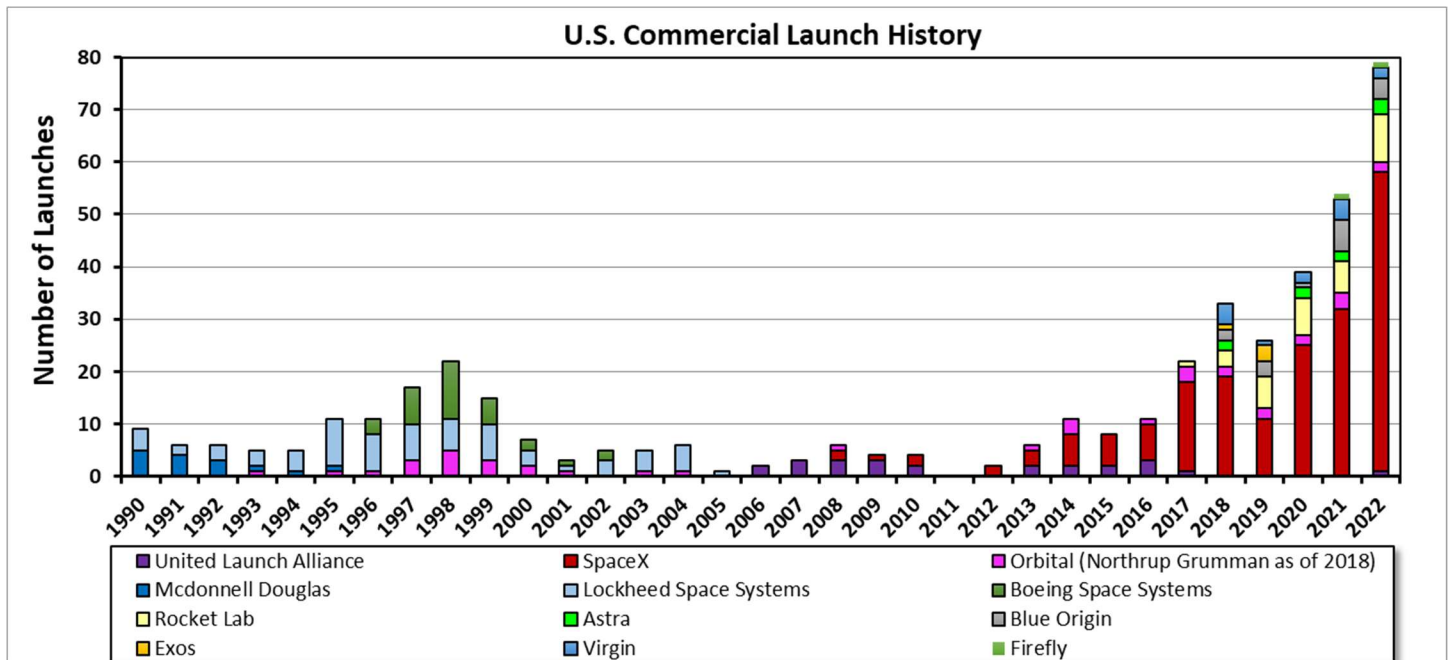
\* Represents the number of hits to contract web services including DUATs (DUATs decommissioned May, 2018).

<b>United States NOTAM Office (USNOF)</b>		
Year	Domestic	International
FY 2017	1,455,238	760,015
FY 2018	1,569,386	874,091
FY 2019	1,670,499	969,951
FY 2020	1,474,047	873,025
FY 2021	1,620,681	953,125
FY 2022	1,644,074	993,139

Sources: FAA, Air Traffic Organization, Flight Service (AJR-B), Email communication, January 17, 2023; FAA, Air Traffic Organization, U.S. NOTAM Office (AJV-A370), Calculations based on email communication, December 7, 2022.

## Commercial Space Launch Activity

During CY2022, the FAA licensed 79 U.S. orbital commercial space launches. These launches were carried out by the following companies: SpaceX, 61 launches; Rocket Lab, 9 (from New Zealand); Blue Origin, 4; Astra, 3; Orbital, 2 (part of Northrup Grumman Innovation Systems as of 2018); Virgin, 2; Firefly, 1; and United Launch Alliance, 1. A graph showing annual numbers of commercial launches, by company, appears below.



Note: A commercial launch is a launch that is internationally competed (i.e., available in principle to international launch providers) or whose primary payload is commercial in nature. FAA-licensed launches carrying captive government (NASA and DOD) or industry payloads are counted here. Data for 2018-2022 include launch failures and successes, and subspace and suborbital launches.

Sources: Federal Aviation Administration, Commercial Space Transportation (AST), The Annual Compendium of Commercial Space Transportation, various years; FAA, Commercial Space Transportation (AST), Launches, as of January 3, 2023. [https://www.faa.gov/data\\_research/commercial\\_space\\_data/launches/?type=license](https://www.faa.gov/data_research/commercial_space_data/launches/?type=license); U.S. Dept. of Transportation, Bureau of Transportation Statistics, National Transportation Statistics, Table 1-39, January 17, 2019. <https://www.bts.gov/browse-statistical-products-and-data/national-transportation-statistics/national-transportation-8>

## U.S. Spaceports

U.S. commercial space launches are carried out from FAA-licensed spaceports located throughout the country. As of January 23, 2023, there were 14 active FAA-licensed commercial spaceports. For a map of these locations, and to learn more about U.S. spaceports, please consult the FAA Office of Spaceports web page at: [https://www.faa.gov/about/office\\_org/headquarters\\_offices/ast/programs/office\\_spaceports](https://www.faa.gov/about/office_org/headquarters_offices/ast/programs/office_spaceports)

## Appendix I. Facility Codes

### Core 30 Airports

(Source: System Data and Infrastructure Group, Office of Performance Analysis, Systems Operations Services, Air Traffic Organization, FAA (AJR-G2).)

Code	Airport	Code	Airport
ATL	Hartsfield-Jackson Atlanta International	LAX	Los Angeles International
BOS	Boston Logan International	LGA	New York LaGuardia
BWI	Baltimore/Washington International	MCO	Orlando International
CLT	Charlotte Douglas International	MDW	Chicago Midway
DCA	Ronald Reagan Washington National	MEM	Memphis International
DEN	Denver International	MIA	Miami International
DFW	Dallas-Fort Worth International	MSP	Minneapolis/St. Paul International
DTW	Detroit Metropolitan Wayne County	ORD	Chicago O'Hare International
EWR	Newark Liberty International	PHL	Philadelphia International
FLL	Fort Lauderdale/Hollywood International	PHX	Phoenix Sky Harbor International
HNL	Honolulu International	SAN	San Diego International
IAD	Washington Dulles International	SEA	Seattle/Tacoma International
IAH	George Bush Houston Intercontinental	SFO	San Francisco International
JFK	New York John F. Kennedy International	SLC	Salt Lake City International
LAS	Las Vegas McCarran International	TPA	Tampa International

### Stand-Alone Terminal Radar Control (TRACON) Facilities\*

LocID	TRACON	LocID	TRACON
A11	Anchorage TRACON	NCT	Northern California TRACON
A80	Atlanta TRACON	P31	Pensacola TRACON
A90	Boston TRACON	P50	Phoenix TRACON
C90	Chicago TRACON	P80	Portland TRACON
D01	Denver TRACON	PCT	Potomac TRACON
D10	Dallas-Fort Worth TRACON	R90	Omaha TRACON
D21	Detroit TRACON	S46	Seattle TRACON
F11	Central Florida TRACON	S56	Salt Lake City TRACON
I90	Houston TRACON	SCT	Southern California TRACON
L30	Las Vegas TRACON	T75	St Louis TRACON
M03	Memphis TRACON	U90	Tucson TRACON
M98	Minneapolis TRACON	Y90	Yankee TRACON
N90	New York TRACON		

\*Cape Cod (K90) merged with Boston TRACON (A90); Meridian (NMM) is now a military, not a civilian TRACON.

### Air Route Traffic Control Centers (ARTCC) and Combined Control Facilities (CCF)

LocID	Center	LocID	Center
HCF	Honolulu Control Facility	ZLA	Los Angeles CA ARTCC
JCF	Joshua Tree Control Facility	ZLC	Salt Lake City UT ARTCC
ZAB	Albuquerque NM ARTCC	ZMA	Miami FL ARTCC
ZAN	Anchorage AK ARTCC	ZME	Memphis TN ARTCC
ZAU	Chicago IL ARTCC	ZMP	Minneapolis MN ARTCC
ZBW	Nashua NH ARTCC (Boston)	ZNY	New York NY ARTCC
ZDC	Leesburg VA ARTCC (DC)	ZOA	Oakland CA ARTCC
ZDV	Denver CO ARTCC	ZOB	Cleveland OH ARTCC
ZFW	Fort Worth TX ARTCC	ZSE	Seattle WA ARTCC
ZHU	Houston TX ARTCC	ZSU	San Juan PR Control Facility
ZID	Indianapolis IN ARTCC	ZTL	Atlanta GA ARTCC
ZJX	Jacksonville FL ARTCC	ZUA	Guam Control Facility
ZKC	Kansas City KS ARTCC		

## Appendix II. Other FAA Airport Lists

In addition to the Core 30 airports, FAA also uses several other airport lists, including ASPM 77, OEP 35, and OPSNET 45 airports and 34 Select TRACONS.

### **ASPM 77 Airports**

This is an FAA list of 77 airports, including the Core 30, OEP 35, and other airports. The ASPM (Aviation System Performance Metrics) data includes flights to and from the 77 ASPM airports and all flights by ASPM carriers, as well as flights by those carriers to international and domestic non-ASPM airports. (Source: System Data and Infrastructure Group, Office of Performance Analysis, Systems Operations Services, Air Traffic Organization, FAA (AJR-G2).) (See, Appendix I for the list of Core 30 airports. For OEP 35 airports, see the OEP 35 airport list on the next page.)

<b>Code</b>	<b>Airport</b>	<b>Code</b>	<b>Airport</b>
ABQ	Albuquerque International Sunport	MEM	Memphis International
ANC	Ted Stevens Anchorage International	MHT	Manchester
ATL	Hartsfield-Jackson Atlanta International	MIA	Miami International
AUS	Austin-Bergstrom International	MKE	Milwaukee General Mitchell International
BDL	Bradley International	MSP	Minneapolis/St. Paul International
BHM	Birmingham International	MSY	Louis Armstrong New Orleans International
BNA	Nashville International	OAK	Oakland International
BOS	Boston Logan International	OGG	Kahului
BUF	Buffalo Niagara International	OMA	Omaha Eppley Airfield
BUR	Bob Hope (Burbank/Glendale/Pasadena)	ONT	Ontario International
BWI	Baltimore/Washington International	ORD	Chicago O'Hare International
CLE	Cleveland Hopkins International	OXR	Oxnard
CLT	Charlotte Douglas International	PBI	Palm Beach International
CVG	Cincinnati/Northern Kentucky International	PDX	Portland International
DAL	Dallas Love Field	PHL	Philadelphia International
DAY	Dayton International	PHX	Phoenix Sky Harbor International
DCA	Ronald Reagan Washington National	PIT	Pittsburgh International
DEN	Denver International	PSP	Palm Springs International
DFW	Dallas/Fort Worth International	PVD	Providence Francis Green State
DTW	Detroit Metropolitan Wayne County	RDU	Raleigh/Durham International
EWB	Newark Liberty International	RFD	Greater Rockford
FLL	Fort Lauderdale/Hollywood International	RSW	Southwest Florida International
GYX	Gary Chicago International	SAN	San Diego International
HNL	Honolulu International	SAT	San Antonio International
HOU	Houston Hobby	SDF	Louisville International
HPN	Westchester County	SEA	Seattle/Tacoma International
IAD	Washington Dulles International	SFO	San Francisco International
IAH	George Bush Houston Intercontinental	SJC	Norman Mineta San Jose International
IND	Indianapolis International	SJU	San Juan Luis Munoz International
ISP	Long Island Mac Arthur	SLC	Salt Lake City International
JAX	Jacksonville International	SMF	Sacramento International Airport
JFK	New York John F. Kennedy International	SNA	John Wayne Airport-Orange County
LAS	Las Vegas McCarran International	STL	Lambert Saint Louis International
LAX	Los Angeles International	SWF	Stewart International
LGA	New York LaGuardia	TEB	Teterboro
LGB	Long Beach	TPA	Tampa International
MCI	Kansas City International	TUS	Tucson International
MCO	Orlando International	VNY	Van Nuys
MDW	Chicago Midway		

**OEP 35 Airports**

This is an FAA list of 35 commercial U.S. airports with significant air traffic. These airports serve major metropolitan areas and some also serve as hubs for airline operations. The OEP 35 (Operational Evolution Partnership) is made up of the Core 30, plus five other airports. In 2005, this list was replaced by the Core 30 list. (Source: System Data and Infrastructure Group, Office of Performance Analysis, Systems Operations Services, Air Traffic Organization, FAA (AJR-G2).

[https://aspm.faa.gov/aspmhelp/index/OEP\\_35.html](https://aspm.faa.gov/aspmhelp/index/OEP_35.html).) (See, Appendix I for the list of Core 30 airports.)

<b>Code</b>	<b>Airport</b>	<b>Code</b>	<b>Airport</b>
ATL	Hartsfield-Jackson Atlanta International	LGA	New York LaGuardia
BOS	Boston Logan International	MCO	Orlando International
BWI	Baltimore/Washington International	MDW	Chicago Midway
CLE	Cleveland Hopkins International	MEM	Memphis International
CLT	Charlotte Douglas International	MIA	Miami International
CVG	Cincinnati/Northern Kentucky International	MSP	Minneapolis/St Paul International
DCA	Ronald Reagan Washington National	ORD	Chicago O'Hare International
DEN	Denver International	PDX	Portland International
DFW	Dallas/Fort Worth International	PHL	Philadelphia International
DTW	Detroit Metropolitan Wayne County	PHX	Phoenix Sky Harbor International
EWR	Newark Liberty International	PIT	Pittsburgh International
FLL	Fort Lauderdale/Hollywood International	SAN	San Diego International
HNL	Honolulu International	SEA	Seattle/Tacoma International
IAD	Washington Dulles International	SFO	San Francisco International
IAH	George Bush Houston Intercontinental	SLC	Salt Lake City International
JFK	New York John F Kennedy International	STL	Lambert Saint Louis International
LAS	Las Vegas McCarran International	TPA	Tampa International
LAX	Los Angeles International		

**OPSNET 45 Airports**

The FAA list of OPSNET 45 airports appear below. In the late 1990s, these were airports that contributed to 75 percent of NAS delays and that each had 500 or more operations per day. (Note, by FY2019, the number of OPSNET 45 airports with at least 500 operations per day fell to 36 airports.)

<b>Code</b>	<b>Airport</b>	<b>Code</b>	<b>Airport</b>
ABQ	Albuquerque International Sunport	MCO	Orlando International
ATL	Hartsfield-Jackson Atlanta International	MDW	Chicago Midway
BNA	Nashville International	MEM	Memphis International
BOS	Boston Logan International	MIA	Miami International
BWI	Baltimore/Washington International	MSP	Minneapolis/St Paul International
CLE	Cleveland Hopkins International	MSY	Louis Armstrong New Orleans International
CLT	Charlotte Douglas International	OAK	Oakland International
CVG	Cincinnati/Northern Kentucky International	ORD	Chicago O'Hare International
DCA	Ronald Reagan Washington National	PBI	Palm Beach International
DEN	Denver International	PDX	Portland International
DFW	Dallas/Fort Worth International	PHL	Philadelphia International
DTW	Detroit Metropolitan Wayne County	PHX	Phoenix Sky Harbor International
EWR	Newark Liberty International	PIT	Pittsburgh International
FLL	Fort Lauderdale/Hollywood International	RDU	Raleigh/Durham International
HOU	Houston Hobby	SAN	San Diego International
IAD	Washington Dulles International	SEA	Seattle/Tacoma International
IAH	George Bush Houston Intercontinental	SFO	San Francisco International
IND	Indianapolis International	SJC	Norman Mineta San Jose International
JFK	New York John F	SLC	Salt Lake City International
LAS	Las Vegas McCarran International	STL	Lambert Saint Louis International
LAX	Los Angeles International	TEB	Teterboro
LGA	New York LaGuardia	TPA	Tampa International
MCI	Kansas City International		

**34 Select TRACONs**

The 34 Select are the TRACONs support the OPSNET 45 airports. (See, above for the list of OPSNET 45 airports.) (Source: System Data and Infrastructure Group, Office of Performance Analysis, Systems Operations Services, Air Traffic Organization, FAA (AJR-G2). [https://aspm.faa.gov/aspmhelp/index/34\\_Select.html](https://aspm.faa.gov/aspmhelp/index/34_Select.html))

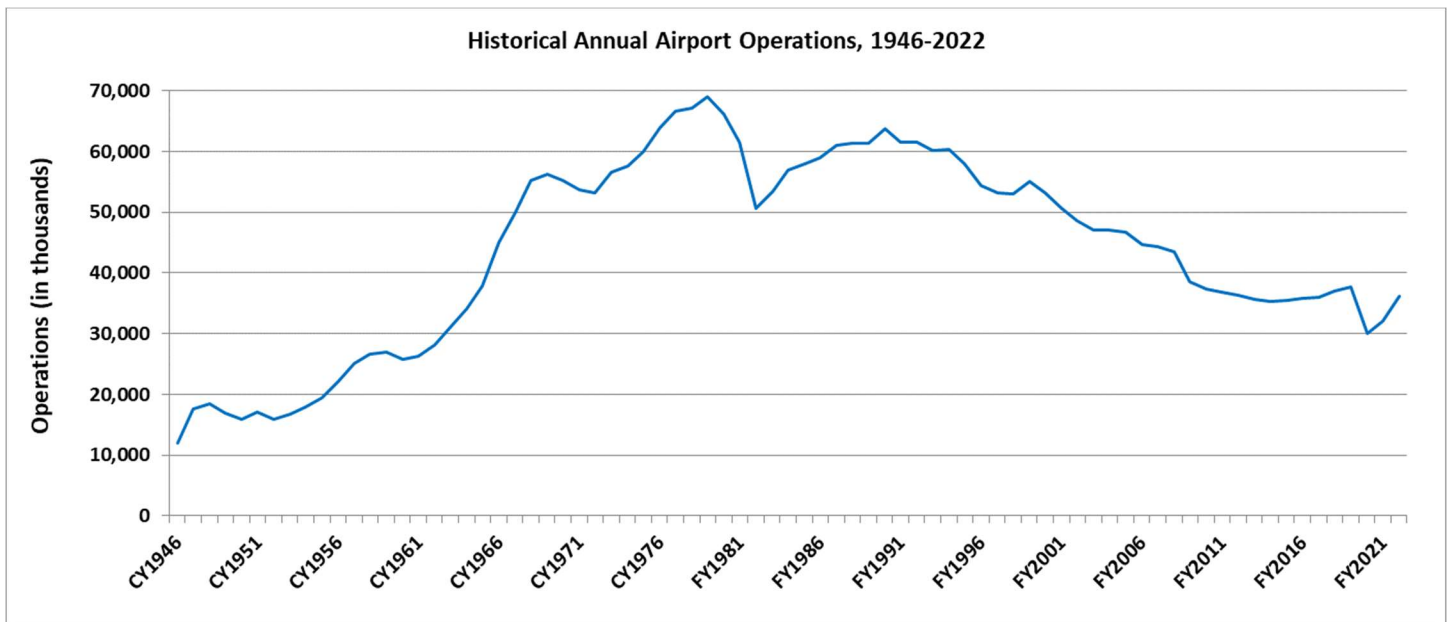
<b>LocID</b>	<b>TRACON</b>	<b>LocID</b>	<b>TRACON</b>
A80	Atlanta TRACON	MEM	Memphis International
A90	Boston TRACON	MIA	Miami International
ABQ	Albuquerque International	MSY	New Orleans International/Moisant
BNA	Nashville International	N90	New York TRACON
C90	Chicago TRACON (Elgin)	NCT	Northern California TRACON
CLE	Cleveland Hopkins International	P50	Phoenix TRACON
CLT	Charlotte/Douglas International	P80	Portland TRACON
CVG	Covington/Cincinnati International	PBI	Palm Beach International
D01	Denver TRACON	PCT	Potomac TRACON
D10	Dallas/Ft Worth TRACON	PHL	Philadelphia International
D21	Detroit TRACON	PIT	Pittsburgh International
I90	Houston TRACON	RDU	Raleigh Durham International
IND	Indianapolis International	S46	Seattle/Tacoma TRACON
L30	Las Vegas TRACON	S56	Salt Lake City TRACON
M98	Minneapolis TRACON	SCT	Southern California TRACON
MCI	Kansas City International	T75	St Louis TRACON
MCO	Orlando International	TPA	Tampa International

## Appendix III. Historical Airport and Center Operations

### Airport Operations

A graph displaying historical annual airport control tower data for 1946-2022 appear below. Included are calendar year data for 1946-1976 and fiscal year data for 1977-2022. Airport towers consist of FAA facilities, not including contract towers, and represent the number of arrivals and departures from the airport at which the airport traffic control tower is located. (Data for 1946-1990 were originally published in the [CAA Statistical Handbook of Civil Aviation](#) and the successor publication [FAA Statistical Handbook of Aviation](#). Data for 1991 onward come from the FAA OPSNET database.)

In FY2022, airport operations amounted to 36.1 million, rising by 12.5 percent, from 32.1 million in FY2021 (below). Such operations peaked 43 years earlier, in FY1979, at 69 million. (This decrease was mainly due a decrease in general aviation (GA) operations which fell from 51.7 million in FY1979 to 15.2 million in FY2022 (not shown below)).



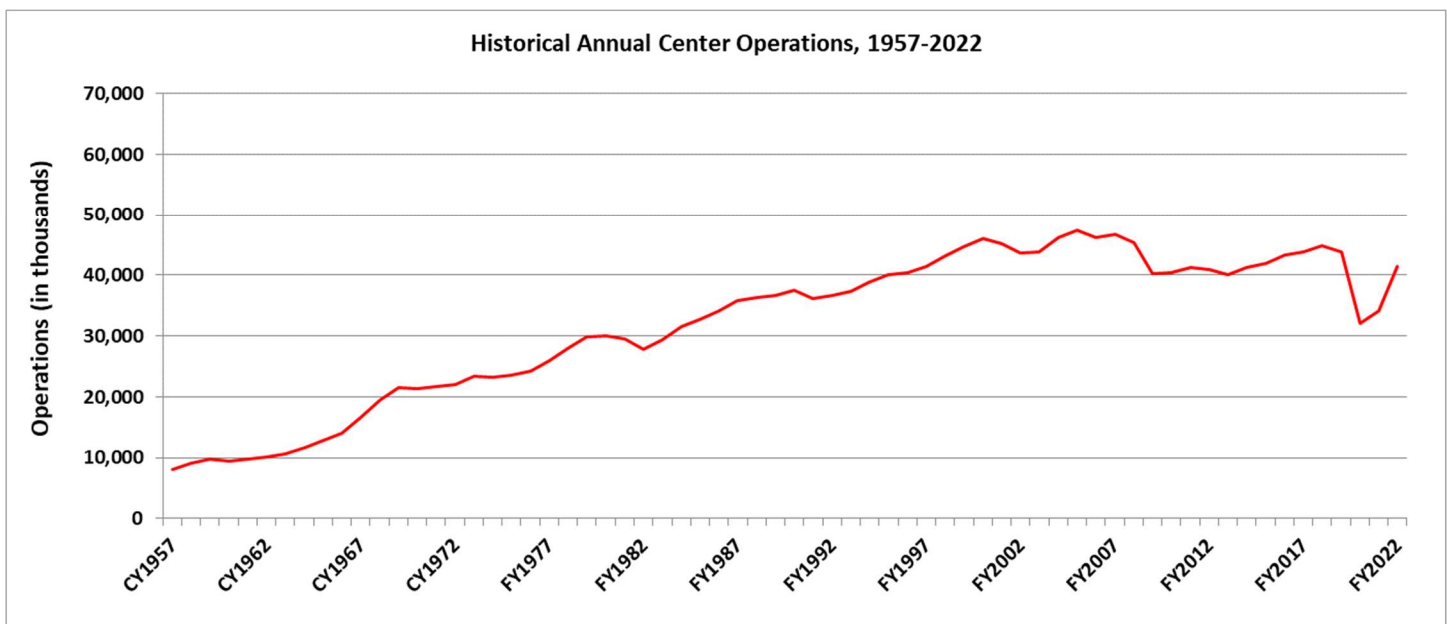
Sources: 1946-1963: Civil Aeronautics Administration, [CAA Statistical Handbook of Civil Aviation](#), various; 1964-1990: Federal Aviation Administration, [FAA Statistical Handbook of Aviation](#), various; 1991-present: Federal Aviation Administration, Air Traffic Organization, Office of Performance Analysis (AJR-G), [Operations Network \(OPSNET\)](#), November 3, 2022.

### Center Operations

Historical annual center operations for 1957-2022 are shown below. Included are calendar year data for 1957-1976 and fiscal year data for 1977-2022. In contrast to airport operations, center operations consist of the number of operations passing to and from a TRACON to a center, or from one center to another center, or from a center to a TRACON, and also includes U.S. overflights and oceanic traffic through center air space that do not arrive at or depart from U.S. territory. (Data up to 1990 were originally published in the [CAA Statistical Handbook of Civil Aviation](#) and the [FAA Statistical Handbook of Aviation](#). Data for 1991 onward come from the FAA OPSNET database.)

In FY2022, there were 41.4 million center operations, rising by 21.5 percent from 34.1 million in FY2021. The peak occurred in FY2005, at 47.5 million. (The decrease over FY2005 - FY2021 was mainly due to a fall in center air taxi operations, which fell from 10.9 million in FY2005 to 6 million in FY2022 (not shown below)).

The histories of airport and center operations also differ because in the past, airport operations largely consisted of GA flights. Such operations were mainly local and did not cross into center airspace; therefore, the large decrease in GA operations did not lead to a large decrease in center operations. In contrast, center GA operations, which numbered 8.8 million in FY1979, fell to about 7 million in FY2022 (not shown below). (In addition, note that GA aircraft tend to be smaller and carry fewer passengers over shorter distances and time periods than other user classes such as commercial air carriers.)



Sources: 1957-1963: Civil Aeronautics Administration, [CAA Statistical Handbook of Civil Aviation](#), various; 1964-1990: Federal Aviation Administration, [FAA Statistical Handbook of Aviation](#), various; 1991-present: Federal Aviation Administration, Air Traffic Organization, Office of Performance Analysis (AJR-G), [Operations Network \(OPSNET\)](#), November 3, 2022.

## Glossary of Terms

34 Select TRACONS	The 34 Select are the TRACONS support the OPSNET 45 airports. (See, Appendix II for the lists of 34 Select TRACONS and OPSNET 45 airports.)
AAR	See, Airport Arrival Rate (AAR).
ADC	See, Average Daily Capacity (ADC).
ADR	See, Airport Departure Rate (ADR).
AFP	See, Airspace Flow Programs (AFP).
Airport Arrival Rate (AAR)	The number of arriving aircraft which an airport or airspace can accept from an ARTCC per hour.
Airport Departure Rate (ADR)	The number of aircraft that can depart an airport and the airspace can accept per hour.
Airport Operations	See, Operations.
Airspace Flow Programs (AFP)	Airspace flow programs (AFPs) manage demand-capacity imbalances through the issuance of estimated departure clearance times (EDCT) to flights traversing a flow constrained area (FCA). An AFP might be used, for example, to reduce the rate of flights through a center when that center has reduced en route capacity due to severe weather, replacing mile-in-trail (MIT) restrictions for a required reroute, managing airport arrival fix demand or controlling multiple airports within a terminal area.
Air Route Traffic Control Center (ARTCC)	A facility established to provide air traffic control service to aircraft operating on IFR flight plans within controlled airspace and principally during the en route phase of flight. When equipment capabilities and controller workload permit, certain advisory/assistance services may be provided to VFR aircraft. Also known as en route or centers, there are 21 ARTCCs in the continental U.S. A list of the 21 ARTCCs appears in Appendix I.
Air Traffic Control (ATC)	A service operated by appropriate authority to promote the safe, orderly and expeditious flow of air traffic.
Air Traffic Control Tower (ATCT)	A terminal facility that uses air/ground communications, visual signaling, and other devices to provide ATC services to aircraft operating in the vicinity of an airport or on the movement area. Authorizes aircraft to land or takeoff at the airport controlled by the tower or to transit the Class D airspace area regardless of flight plan or weather conditions (IFR or VFR). A tower may also provide approach control services (radar or nonradar).
Army Radar Approach Control (ARAC).	An FAA air traffic control facility using radar and air/ground communications to provide approach control services to aircraft arriving, departing, or transiting the airspace controlled by the facility. Service is provided to both civilian and U.S. Army airports. Currently, the U.S. does not operate any ARACs.
ASM	See, Available Seat Miles (ASM).
ASPM	See, Aviation System Performance Metrics (ASPM).
ASPM 77 Airports	The ASPM 77 is an FAA list of 77 airports, including the Core 30, OEP 35, and other airports. The ASPM (Aviation System Performance Metrics) data includes flights to and from the 77 ASPM airports and all flights by ASPM carriers, as well as flights by those carriers to international and domestic non-ASPM airports. (See, Appendix II for the list of ASPM 77 airports.) (See, Appendix I for the list of Core 30 airports and Appendix II for the list of OEP 35 airports.)
ATC	See, Air Traffic Control.
ATCT	See, Air Traffic Control Tower.
Available Seat Miles (ASM)	The aircraft miles flown in each inter-airport segment, multiplied by the number of seats available for fare paying passenger use on that segment. Available seat miles are computed by summation of the products of the number of miles on each interairport segment, multiplied by the number of available seats on that segment.
Average Daily Capacity (ADC)	Average daily capacity is calculated as the sum of the airport departure rates (ADR) and the capacity airport arrival rates (AAR), divided by the number of days in the period under consideration.

Average Hourly Capacity (Called Rate)	See, Called Rate.
Aviation System Performance Metrics (ASPM)	<p>Aviation system performance metrics (ASPM) data includes flights to and from 77 ASPM airports (including the Core 30 and OEP 35 airports) and all flights by ASPM carriers, as well as flights by those carriers to international and domestic non-ASPM airports. All IFR and some VFR flights are included. View this data on the OPSNET website.</p> <p>ASPM flight records fall into two groupings: (1) Efficiency flights are intended to capture all traffic handled by controllers at the ASPM airports and include flights with complete records and flights for which accurate estimates are possible due to only a few pieces of missing data; and, (2) ASPM flights exclude general aviation and military traffic, as well as local (non-itinerant) traffic and records for international flights missing data on the non-U.S. portion of the flight.</p> <p>ASPM contains key event times including actual, scheduled as well as the airline reported gate and runway times. It also synthesizes key times from the traffic flow management system (TFMS) and flight level information from the national traffic management log (NTML).</p>
Called Rate	The hourly throughput that an airport's runways are able to sustain during periods of high demand. Called rates include all arrival and departure traffic that an airport can support. The called rate, or average hourly capacity, is the sum of the average arrival rate (AAR) and the average departure rate (ADR).
Cancellations	The set of cancelled departures as determined by a combination of scheduled flights not flown and TFMS flight plans that were cancelled and not re-filed for ASPM carriers and all other carriers reporting schedule data; and ASQP flight cancellations.
CCF	See, Combined Control Facility (CCF).
CAA	See, Civil Aeronautics Administration (CAA).
Center	Also known as air route traffic control center (ARTCC) or en Route. See, Air Route Traffic Control Center (ARTCC).
Center Operations	See, Operations.
CERAP	See, Combined En Route Radar Approach Control (CERAP).
Civil Aeronautics Administration (CAA)	<p>According to the FAA:</p> <p>To ensure a federal focus on aviation safety, President Franklin Roosevelt signed the Civil Aeronautics Act in 1938. The legislation established the independent Civil Aeronautics Authority (CAA), with a three-member Air Safety Board that would conduct accident investigations and recommend ways of preventing accidents. . . . In 1940, President Roosevelt split the CAA into two agencies, the Civil Aeronautics Administration, which went back to the Department of Commerce, and the Civil Aeronautics Board (CAB). The offshoot of the original CAA retained responsibility for ATC, airman and aircraft certification, safety enforcement, and airway development. . . .</p> <p>On the eve of America's entry into World War II, for defense purposes, CAA extended its ATC system to include operation of airport towers. In the postwar era, ATC became a permanent federal responsibility at most airports.</p> <p>The CAA became the Federal Aviation Agency in 1958 and the Federal Aviation Administration (FAA) in 1967 (Federal Aviation Administration, <a href="https://www.faa.gov/about/history/brief_history">A Brief History of the FAA</a>. <a href="https://www.faa.gov/about/history/brief_history">https://www.faa.gov/about/history/brief_history</a>).</p>
Class B Airspaces	Generally, that airspace from the surface to 10,000 feet MSL surrounding the nation's busiest airports in terms of IFR operations or passenger enplanements. The configuration of each Class B airspace area is individually tailored and consists of a surface area and two or more layers (some Class B airspace areas resemble upside-down wedding cakes), and is designed to contain all published instrument procedures once an aircraft enters the airspace.
Combined ATCT TRACONS	See, Terminal Radar Control Facility (TRACON).

Combined Control Facility (CCF)	An air traffic control facility that provides approach control services for one or more airports as well as en route air traffic control (center control) for a large area of airspace. Some may provide tower services along with approach control and en route services. The U.S. has four CCFs. A list of the 4 CCFs appears in Appendix I.
Combined En Route Radar Approach Control (CERAP)	An air traffic control facility that combines the functions of an ARTCC with a TRACON facility.
Core 30 Airports	The 30 airports with the highest number of operations. A list of the Core 30 Airports appears in Appendix I.
Delays	See, OPSNET Delays.
Diversions	Gate return/air return and en route diversion are considered a diversion. However, a planned stop for fuel, known before departure from the gate, where the flight has been dispatched to is not.
Direct User Access Terminal Service (DUATS)	DUATS, or direct user access terminal service is a weather information and flight plan processing service contracted by FAA for use by United States civil pilots and other authorized users. The DUAT Service is a telephone- and Internet-based system which allows the pilot to use a personal computer for access to a Federal Aviation Administration (FAA) database to obtain weather and aeronautical information and to file, amend, and cancel domestic IFR and VFR flight plans.
DUATS	See, Direct User Access Terminal Service (DUATS).
EDCT	See, Expected Departure Clearance Time (EDCT).
Enhanced Traffic Management System (ETMS)	See, Traffic Flow Management System (TFMS).
En Route	Also known as Air Route Traffic Control Center (ARTCC) or, simply, Center. See, Air Route Traffic Control Center (ARTCC).
En Route Operations	See, Operations.
Expected Departure Clearance Time (EDCT)	The runway release time assigned to an aircraft in a traffic management program. See also, Ground Delay Programs (GDP).
FAA	See, Federal Aviation Administration (FAA).
FCA	See, Flow Constrained Area (FCA).
Federal Aviation Administration (FAA)	The Federal Aviation Act of 1958 created the agency under the name Federal Aviation Agency. The name Federal Aviation Administration was adopted in 1967 when it became a part of the newly created Department of Transportation. The major roles of this agency include: <ul style="list-style-type: none"> <li>• Regulating civil aviation to promote safety</li> <li>• Encouraging and developing civil aeronautics, including new aviation technology</li> <li>• Developing and operating a system of air traffic control and navigation for both civil and military aircraft</li> <li>• Researching and developing the National Airspace System and civil aeronautics</li> <li>• Developing and carrying out programs to control aircraft noise and other environmental effects of civil aviation</li> <li>• Regulating U.S. commercial space transportation</li> </ul>
Federal Aviation Agency	The Federal Aviation Agency replaced the Civil Aeronautics Administration (CAA) under the Federal Aviation Act of 1958. In turn, the Federal Aviation Agency was replaced by the Federal Aviation Administration in 1967, which became a part of the newly created Department of Transportation.
Flight	The period from the start of the takeoff roll to the first landing.
Flight Service Station (FSS)	A flight service station (FSS) is an air traffic facility that provides information and services to aircraft pilots before, during, and after flights, but unlike air traffic control (ATC), is not responsible for giving instructions or clearances or providing separation.

Flow Constrained Area (FCA)	A defined region of airspace, a time interval, or other characteristic used to identify flights subject to a constraint. This constraint may be due to convective weather, military exercises, or other reasons.
FSS	See, Flight Service Station (FSS).
GDP	See, Ground Delay Programs (GDP).
Go Around	A go around (sometimes called overshoot) is an aborted landing of an aircraft that is on final approach.
Ground Delay Programs (GDP)	<p>Ground delay programs are implemented to control air traffic volume to airports where the projected traffic demand is expected to exceed the airport's acceptance rate for a lengthy period of time. Lengthy periods of demand exceeding acceptance rate are normally a result of the airport's acceptance rate being reduced for some reason. The most common reason for a reduction in acceptance rate is adverse weather such as low ceilings and visibility.</p> <p>How it works:</p> <p>Flights that are destined to the affected airport are issued expected departure clearance times (EDCT) at their point of departure. Flights that have been issued EDCTs are not permitted to depart until their expected departure clearance time. These EDCTs are calculated in such a way as to meter the rate that traffic arrives at the affected airport; ensuring that demand is equal to acceptance rate. The length of delays that result from the implementation of a ground delay program depends upon two factors: how much greater than the acceptance rate the original demand was, and for what length of time the original demand was expected to exceed the acceptance rate.</p>
Ground Stops (GS)	<p>Ground stops are implemented for a number of reasons. The most common reasons are:</p> <ul style="list-style-type: none"> <li>• To control air traffic volume to airports when the projected traffic demand is expected to exceed the airport's acceptance rate for a short period of time.</li> <li>• To temporarily stop traffic allowing for the implementation of a longer-term solution, such as a ground delay program.</li> <li>• The affected airport's acceptance rate has been reduced to zero.</li> </ul> <p>How it works:</p> <ul style="list-style-type: none"> <li>• Flights that are destined to the affected airport are held at their departure point for the duration of the ground stop.</li> </ul>
Holdings	Holding (or flying a hold) is a maneuver designed to delay an aircraft already in flight while keeping it within a specified airspace.
IFR Flights	Instrument Flight Rules. A set of rules governing the conduct of flight under instrument meteorological conditions.
Level-Offs	Level-offs are tracked from the top-of-descent (TOD) point or 200 nautical miles (NM) from the airport, whichever is closer. A trajectory segment is considered as a level-off if the change in altitude of position reports is less than or equal to 200 feet and the segment is at least 50 seconds in duration. The metric is calculated as the sum of the count of level-offs for each flight within a scope (i.e. non-military instrument flight rules (IFR) operations arriving into Core 30 airports), divided by the total number of flights within the scope. The metric is derived from flight position reports from the National Offload Program (NOP).
Load Factor	The summation of the number of revenue passenger miles (RPM), divided by the summation of the number of available seat miles (ASM), on revenue paying commercial flights. This quotient is expressed as a percentage. <i>See also</i> , available seat miles (ASM) and revenue passenger miles (RPM).
Loss of Separation Events	A defined loss of separation between airborne aircraft occurs whenever specified separation minima in controlled airspace are breached. Minimum separation standards for airspace are specified by air traffic service (ATS) authorities, based on International Civil Aviation Organization (ICAO) standards.
Miles-in-Trail (MIT)	A specified distance between aircraft (in nautical miles), normally, in the same stratum associated with the same destination or route of flight.
National Airspace System (NAS)	The common network of U.S. airspace; air navigation facilities, equipment and services, airports or landing areas; aeronautical charts, information and services; rules, regulations and procedures, technical information, and manpower and material. This includes system components jointly shared with the military.
Notices to Airmen (NOTAM)	See, Notices to Air Missions (NOTAM).

Notices to Air Missions (NOTAM)	A NOTAM is a notice containing information essential to personnel concerned with flight operations, but not known far enough in advance to be publicized by other means. It states the abnormal status of a component of the national airspace system (NAS) – not the normal status.
OEP 35 Airports	This is an FAA list of 35 commercial U.S. airports with significant air traffic. These airports serve major metropolitan areas and some also serve as hubs for airline operations. The OEP 35 (Operational Evolution Partnership) is made up of the Core 30, plus five other airports (Cincinnati, Cleveland, Pittsburgh, Portland, and St Louis). In 2005, this list was replaced by the Core 30 list. (Source: System Data and Infrastructure Group, Office of Performance Analysis, Systems Operations Services, Air Traffic Organization, FAA (AJR-G2). <a href="https://aspm.faa.gov/aspmhelp/index/OEP_35.html">https://aspm.faa.gov/aspmhelp/index/OEP_35.html</a> .) (See, Appendix I for the list of Core 30 airports and Appendix II for the list of OEP 35 airports.)
Operational Network (OPSNET)	OPSNET is the official source of national airspace system (NAS) air traffic operations and delay data. This data are used to analyze the performance of the FAA's air traffic control facilities. Reportable delay includes information such as the constrained facility, the reason for delay (weather, equipment, runways, volume, etc.), and the traffic management initiative (TMI) employed in delaying the aircraft.
Operations	<ul style="list-style-type: none"> <li>Airport operations: The number of arrivals and departures from the airport at which the airport traffic control tower is located.</li> <li>Tower operations: Airport operations, plus airport tower overflights.</li> <li>TRACON operations: The number of operations passed to and from area airports or centers, including overflights through TRACON airspace.</li> </ul> <p>En route or center operations: The number of operations passing to and from a TRACON to a center, or from one center to another center, or from a center to a TRACON. It includes U.S. overflights and oceanic traffic through center air space that do not arrive at or depart from U.S. territory.</p>
OPSNET 45 Airports	The FAA list of OPSNET 45 airports appear below. In the late 1990s, these were 45 airports that contributed to 75 percent of NAS delays and had 500 or more operations per day. (Note, by FY2019, the number of OPSNET 45 airports with at least 500 operations per day fell to 36 airports.) (See, Appendix II for the list of OPSNET 45 airports.)
OPSNET Delays	<p>Delays to instrument flight rules (IFR) traffic of 15 minutes or more, which result from the ATC system detaining an aircraft at the gate, short of the runway, on the runway, on a taxiway, or in a holding configuration anywhere en route, must be reported. The IFR controlling facility must ensure delay reports are received and entered into OPSNET. These OPSNET delays are caused by the application of initiatives by the traffic flow management (TFM) in response to weather conditions, increased traffic volume, runway conditions, equipment outages, and other causes.</p> <p>Below are descriptions of the categories of delay causes resulting in a reportable delay:</p> <ul style="list-style-type: none"> <li>Weather: The presence of adverse weather conditions affecting operations. This includes wind, rain, snow/ice, low cloud ceilings, low visibility, and tornado/ hurricane/thunderstorm.</li> <li>Volume: Delays must only be reported as volume when the airport is in its optimum configuration and no impacting conditions have been reported when the delays were incurred.</li> <li>Runway/Taxiway: Reductions in facility capacity due to runway/taxiway closure or configuration changes.</li> <li>Equipment: An equipment failure or outage causing reduced capacity.</li> <li>Other: All impacting conditions that are not otherwise attributed to weather, equipment, runway/taxiway, or volume, such as airshow, aircraft emergency, bomb threat, external radio frequency interference, military operations, nonradar procedures, etc.</li> </ul> <p>Non-reportable delays are delays incurred by IFR traffic, but which should not be reported in OPSNET.</p>
Overflights	<ul style="list-style-type: none"> <li>Terminal overflight: A terminal IFR flight that originates outside the TRACON's/RAPCON's/Radar ATCT's area and passes through the area without landing.</li> <li>En route overflight: An en route IFR flight that originates outside the ARTCC's area and passes through the area without landing.</li> </ul>
Radar Approach Control (RAPCON)	An FAA air traffic control facility using radar and air/ground communications to provide approach control services to aircraft arriving, departing, or transiting the airspace controlled by the facility. Service is provided to both civilian and U.S. Air Force airports. Currently, the U.S. does not operate any RAPCONs.

Radar ATC Facility (RATCF)	An FAA air traffic control facility using radar and air/ground communications to provide approach control services to aircraft arriving, departing, or transiting the airspace controlled by the facility. Service is provided to both civilian and U.S. Navy airports. Currently, the U.S. does not operate any RATCFs.
RAPCON	See, Radar Approach Control (RAPCON).
RATCF	See, Radar ATC Facility (RATCF).
Revenue Passenger Miles (RPM)	One revenue passenger (fare paying passenger) transported one mile. Revenue passenger miles are computed by summation of the products of the revenue aircraft miles on each interairport segment, multiplied by the number of revenue passengers carried on that segment.
Runway Incursions	A runway incursion is any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle or person on the protected area of a surface designated for the landing and takeoff of aircraft.
Stand-Alone TRACON	See, Terminal Radar Control Facility (TRACON).
Terminal Radar Control Facility (TRACON)	An FAA air traffic control facility using radar and air/ground communications to provide approach control services to aircraft arriving, departing, or transiting the airspace controlled by the facility. A TRACON located in an air traffic control tower is a combined TRACON. A TRACON that does not share a facility is a stand-alone TRACON. The U.S. has 149 civilian TRACONs. There are 124 TRACONs in shared facilities and 25 stand-alone TRACONs. A list of the 25 stand-alone TRACONs appears in Appendix I.
Top-of-Descent (TOD)	Top-of-Descent is the transition from the cruise phase of a flight to the descent phase, the point at which the planned descent to final approach altitude is initiated.
Tower Operations	See, Operations.
TRACON	See, Terminal Radar Control Facility (TRACON).
TRACON Operations	See, Operations.
Traffic Flow Management System (TFMS)	TFMS is a data exchange system for supporting the management and monitoring of national air traffic flow. TFMS processes all available data sources such as flight plan messages, flight plan amendment messages, and departure and arrival messages. TFMS is restricted to the subset of flights that fly under instrument flight rules (IFR) and are captured by the FAA's en-route computers. Formerly known as the enhanced traffic management system (ETMS).
VFR	See, Visual Flight Rules (VFR).
VFR flights	Flights operated under visual flight rules.
Visual Flight Rules (VFR)	Visual flight rules are rules that govern the procedures for conducting flights under visual conditions. The term "VFR" is also used in the United States to indicate weather conditions that are equal to or greater than minimum VFR requirements. In addition, it is used by pilots and controllers to indicate a type of flight plan.

## Acknowledgements

The Office of Performance Analysis is very grateful for the helpful contributions, comments, and guidance from:

**Camille Baker**, FAA

**Bill Daugherty**, FAA

**Kevin Hanson**, FAA

**Ed Jennings**, FAA

**Ashish Khatta**, FAA

**Josie Lee**, FAA

**Julia Schutter**, FAA

**Kamala Shetty**, FAA

**Brian Verna**, FAA

**Gregory Yuhasz**, FAA

For more information, please send inquiries to:

**Randal Matsunaga**

[randal.matsunaga@faa.gov](mailto:randal.matsunaga@faa.gov)

Economist, System Events and Analysis Group (AJR-G3)

Office of Performance Analysis